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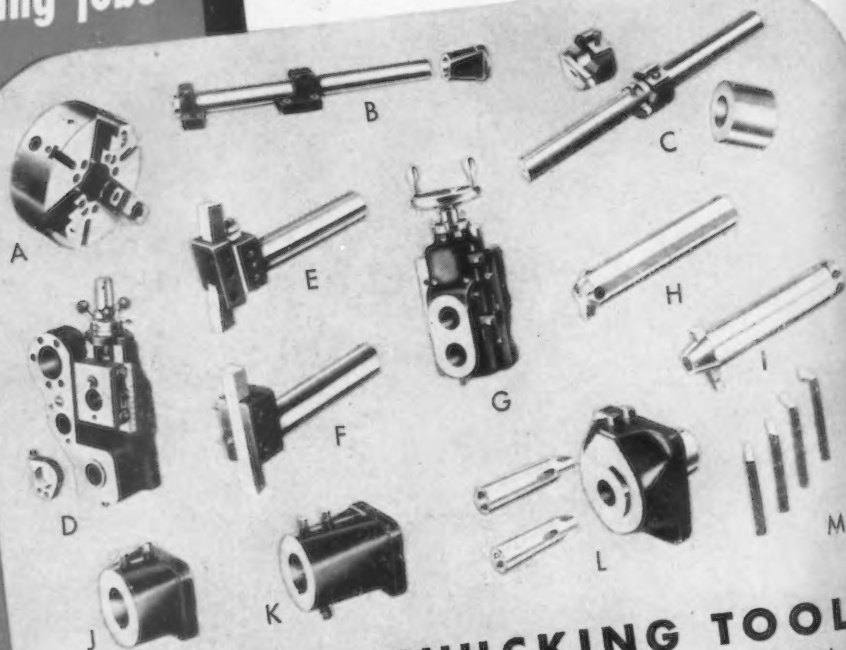
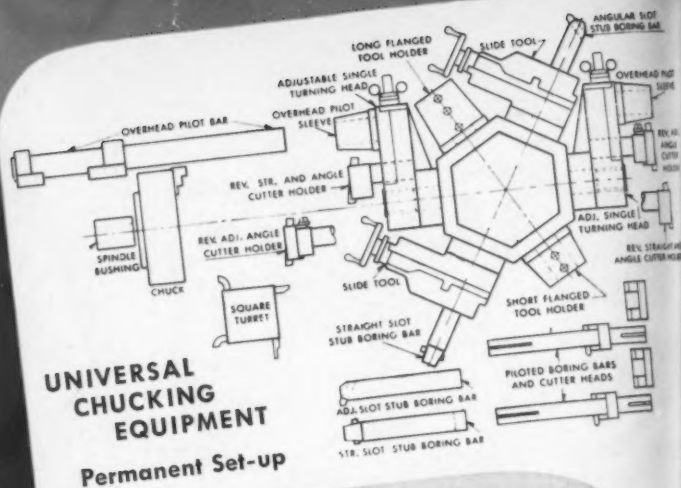
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FEBRUARY 5, 1942

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ESTABLISHED 1855



Salvage . . .

THE Bureau of Industrial Conservation, it was recently announced, is completing a state by state organization to "see to it that every available pound of paper, metal, rags and rubber, now unused in shops or homes, is moved to the plants and mills that must have an unceasing stream of these materials to achieve maximum production."

That's fine. But why lock the barn door after the horse is stolen?

The time to begin the conservation of materials, call it salvage or what you will, is before waste and scrap are produced. Salvage, in other words, begins on the drawing board and ends on the scrap pile.

When we reclaim scrap from the junk pile, we are saving material. When we prevent spoilage, or cut down the amount of scrap being made in production, we are saving material and what is more important, time and labor.

There is a lot of precious time and labor, as well as material, going into our scrap piles today because of unnecessary rigidity of munitions specifications. And because local inspectors, who must follow these specifications to the letter, are not permitted to exercise the judgment that would be and is permitted them in private industry.

No small part of this unnecessary waste, which is costing us precious time as well as material, is due, I think, to the fact that many munitions specifications are based upon shop practice of 20 years ago and do not recognize the great engineering strides made since then in the reclamation of rejects.

Under our present system of munition part inspection, if a bore is too large or a spindle diameter too small, the one or the ten thousand pieces affected are thrown summarily on the scrap heap, together with the labor that has gone into them and the precious time it took to make them. In private industry, these parts would be built up to the required diameters by a simple process such as metallizing and the hours of labor and pounds of materials involved would be salvaged before getting to the scrap pile.

Under our present system of military and naval inspection, I have known of gear case covers having been discarded because of minor surface defects, although their whole function was merely to keep lubricating oil from splashing out of gear reduction sets. In private industry, these defects would have been filled in with weld metal and made perfectly serviceable.

It would be a good thing if we had salvage engineering departments in our Army and Navy bureaus to whom contractors could refer such cases. Correction of mistakes, when they can be rectified, is not discreditable; throwing away hours of labor and pounds of material is. We do not think Germany and its engineers are giving that sort of comfort to the enemy.

J. H. Vandeventer

Better Steels Are Coming— from the Tests of War

Out of today's grueling war tests are coming better steels for tomorrow. In Britain, Russia, North Africa, and the Far East equipment built of American steel is setting new performance and endurance records.

But, we have not yet come to the end, for world-wide battle tests are pointing the way to new requirements that are being met in the laboratories and the steel mills of America.

Inland is actively taking its place in this new phase of the steel age. Before World War II Inland gave to industry such valuable steel mill products as: high-strength Hi-Steel; fast machining Ledloy; finer cold reduced tin plate; etc.

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Industrial Powder Metallurgy

By P. R. KALISCHER

Research Laboratories, Westinghouse
Electric & Mfg. Co., East Pittsburgh

IN the past few years, there have appeared in numerous publications articles† on powder met-

† Other articles on the metallurgy of powders that have appeared in THE IRON AGE are: "Powder Metallurgists Debate Techniques," Oct. 30, 1941, p. 29. "Carbides: From Powder to Tool Bits," Oct. 23, 1941, pp. 36-37. "Hot Pressing Iron Powder," Sept. 4, 1941, p. 37. "Powder Metallurgy: Some Important Technical Aspects," April 17, 1941, p. 23. "Limitations of Powder Metallurgy," Dec. 19, 1940, p. 31. "Processing Trends in Powder Metallurgy," Sept. 19, 1940, p. 39. "Metal Powders—Effects of Time, Temperature and Pressure on Density," Feb. 22, 1940, p. 36.

allurgy. In general, these articles fall into two classes: Those treating the subject broadly, and those on some specific topic wherein the author has given considerable data, but has so limited his discussion that no wide interest is served.

In treating a relatively new subject, it is helpful to compare it with one that is older and more familiar. An apt comparison in the case of powder metallurgy can be found in the ceramic industry*. In the case

* The German industry gives to powder metallurgy the name, "Metalceramics."

of a common brick it is well known that the processes involved are the mixing of the proper clays and other ingredients, pressing the mixture in a die of suitable shape and size and then firing the pressed clay mixture to obtain the final brick. In powder metallurgy the same general steps are followed. Metal powders of the desired com-

... Techniques and procedures, as well as the metallurgical aspects, of the manufacture of parts from metal powders are examined in this series of two articles. Advantages and restrictions in using metal powders are discussed.

position are mixed and then pressed in a die of the desired shape and size. The pressed mixture is then fired to secure a finished product of the desired properties. Powder metallurgy is a counterpart of the old and well-known ceramic industry dressed up in somewhat different terminology, using finely divided metals as a working medium instead of clays. It should be noted, however, that the analogy is applicable only in the broadest sense. Powder metallurgy has outgrown its infancy and is rapidly becoming an important branch of science and technology in its own right.

As in the case of every science, there has grown up a vocabulary peculiar to powder metallurgy, and familiarity with this terminology is essential to an understanding of the literature. The following glossary, while incomplete, covers the more general terms in use:

METAL POWDER: Discrete metal particles of small size, generally less than 0.01 in., along their greatest dimension.

FORMING PRESSURE: The pressure (expressed in lb. per sq. in., or some similar figure) that is used to compact the metal powder in the die.

POWDER COMPACT: The piece formed by pressing the metal powders wherein the adhesive forces holding the metal particles

together are probably mechanical. In general, this term applies only before the pressed piece is fired or heat treated.

SINTERING: The bonding together of the separate metal particles in a powder compact by the application of heat. In general, this term applies only if the temperature at which the bonding takes place is below the melting point of the constituents.

SINTERING TEMPERATURE: The temperature at which sintering takes place in any particular operation.

SINTERING TIME: The time required to give the desired degree of bonding in the powder compact.

IMPREGNATION: The bonding together of the metal particles in a powder compact by means of an absorbed molten material, either metallic or non-metallic.

GROWTH OR SHRINKAGE: The dimensional changes that occur during sintering.

POROSITY: The volume of voids in the powder compact, generally expressed as the percentage of the total volume of the piece. Thus, 20 per cent porosity means that 20 per cent of the volume of the piece is composed of voids between the metal particles.

SOLID DIFFUSION: The atomic intermingling of the metal particles so as to form or approach a sound homogeneous mass similar to wrought materials of the same composition. This intermingling occurs at temperatures below the melting point of the constituent metals.

COINING: The repressing of a sintered part to bring it to exact size.

APPARENT DENSITY: If a powder is allowed to fall freely into a container of any specific shape and volume, the weight of

powder required to fill the container will be dependent upon the distance through which the particles fall. The apparent density of a powder then is the weight of powder required to fill a 1-in. cube when the distance through which the powder falls freely is held constant.

COMPRESSION RATIO: The ratio of the initial volume of powder in a die, as loosely filled, to the ratio of the volume after compression under a pressure of 30 tons per sq. in.

As regards the fundamentals of powder metallurgy, consider at the start a few irregularly shaped metal particles placed closely together and confined within a die cavity, as shown in Fig. 1a. If now, the die plunger is forced down onto the metal particles they will be distorted so as to fill the die cavity and, at the same time, will become interlocked so that when the pressure on the die plunger is removed the particles will retain the shape they assumed under pressure as shown in Fig. 1b.

While the pressure was being applied to the particles, they not only deformed but at the same time slid slightly on each other and broke the surface film of oxide which is always present on the particles of metals. When this oxide film was broken, the clean metal surfaces came into contact to a sufficient extent so that in some spots welding took place thus helping to hold the particles in the form they assumed while under pressure. While the welding that takes place during pressing is probably very slight, it is none the less real and is of great importance in the subsequent behavior of the metal compact.

Now assume that the compressed metal particles are removed from the die and placed in a furnace at some predetermined high temperature and in a suitable atmosphere so that there will be no oxidation of the metals but reduction of the oxide films may occur. Over a period of time there will be a migration of atoms from each particle into others. If sufficient time is allowed, and if solid solubility relations are suitable, the particles will ultimately grow into a single uniform, coherent mass. This migration of the atoms is shown schematically in Fig. 2; the initial condition of the particles being shown in Fig. 2a and subsequent conditions as the migration proceeds in Fig. 2b. This migration of the atoms occurs at temperatures below the melting point of the constituent metals and is the phenomenon of solid diffusion.

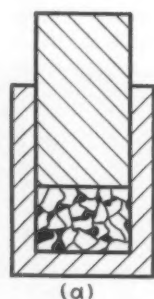
Since there exists no liquid phase

to act as a solvent for any solid phase which might be present, the importance of solid diffusion can be readily understood since it is the only means by which sufficient bonding can occur between the metal particles to give the desired physical properties to the powder part. This solid diffusion can take place only when there are clean metal surfaces in contact with each other. For this reason the slight welding action that occurs during the pressing operation is of utmost importance since it furnishes a starting point for diffusion.

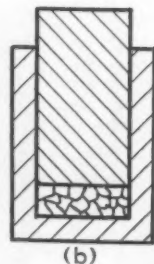
In Figs. 1 and 2, the particles are shown as though they had completely deformed so that no voids exist. Actually, however, there are always voids between the particles, as shown in Fig. 3, their size being dependent upon the characteristics of the powder and upon the forming pressures used. In practice the voids, expressed as porosity, may vary from 30 to as high as 60 per cent, and the sintered piece may have from 2 to 40 or 50 per cent porosity, depending upon the sintering time and temperature, and the use to which it is to be put. The mechanism by which the voids in the powder compact are closed by sintering is not known, but it is probably due to surface energy causing plastic flow of the metals at the sintering temperature. Regardless of the actual mechanism involved in decreasing the percentage

porosity during sintering, such action does take place accompanied by shrinkage of the compact. The amount of shrinkage and decrease in porosity are, of course, dependent upon such factors as forming pressure, sintering temperatures and sintering time, which factors will be discussed.

In any operation involving solid diffusion, the rate of diffusion is dependent upon the temperature. The relationship between rate of diffusion and temperatures for a variety of metals in the wrought or massive state has been worked out, and from these rates it is known that under the best of conditions solid diffusion is slow. To slow down the diffusion further in the case of powder compacts, there is a relatively small area of contact between the metal particles instead of the fairly large area available in the experimental determination of diffusion coefficients. However, from the experimental evidence it is known that to obtain a completely homogeneous material from metal powders within any commercially economic length of time, certain fundamental conditions must be met. These are: (1) The metals should be as chemically dissimilar as possible, (2) the crystal structure of the metals should be similar, (3) the melting points of the metals should be as far apart as possible, and, (4)



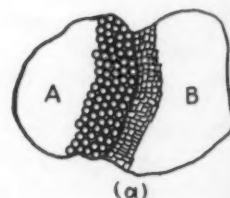
(a)



(b)

LEFT

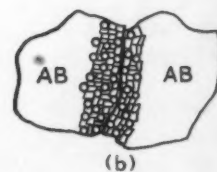
FIG. 1 — (a) Loosely packed powder in the die cavity. The black areas are voids or open spaces. (b) After compression, the metal powders do not show these voids, but some are still present although greatly reduced in size.



(a)

RIGHT

FIG. 2 — (a) Before diffusion takes place, two powder particles may be abutted, but there is no evidence of the transfer of atoms from one particle to the other. (b) In a well diffused powder compact, the particles have lost all individual identity and are two crystals of a homogeneous mass.



(b)

the solid solubility of the different metals in each other should be high.

There are, of course, other factors that enter into the picture, but these four considerations are most important. It is now desirable to determine what these conditions mean in practice. First, consider the case of a mixture of iron and nickel powders. Here the rate of solid diffusion will be excessively slow since the two metals are very similar chemically and have melting points that are close together. The crystal structures are, however, of the same type that will aid diffusion. On the other hand in the case of iron and chromium, these two metals are quite different in chemical properties, widely separated as to melting points, and, at high temperatures, of similar crystal structures so that conditions for rapid diffusion are established. These conclusions have been borne out by experimental work. It can thus be decided in advance which alloys can be made most readily by powder metallurgical processes and which cannot.

To illustrate the predictability of alloying in powder metallurgical processes, an example can

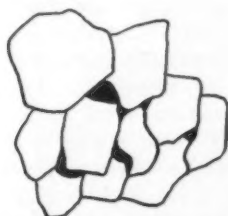
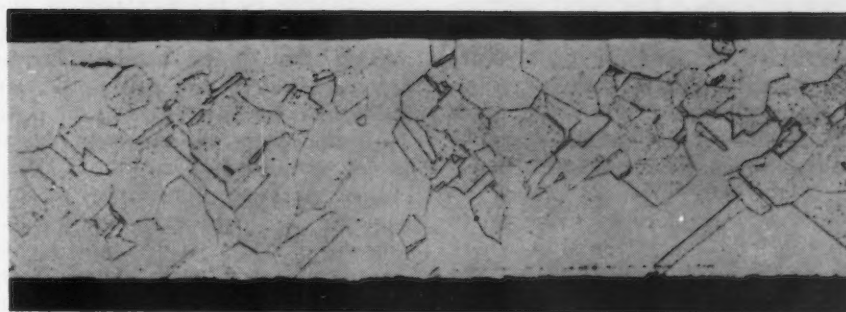
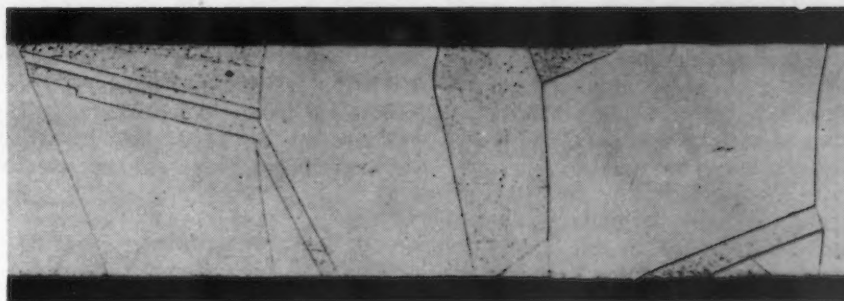


FIG. 3—There are always voids between the particles, their size dependent upon the powder and forming pressures. The dark areas here are the voids.

be cited in the case of an iron-chromium alloy containing 12 per cent chromium. This alloy can be made from powders, and by sintering at about 2102 deg. F., for 10 or 12 hr., it is possible to produce a piece having a porosity of less than 3 per cent and corrosion and oxidation resistance properties equal to or superior to wrought material of the same composition. On the other hand, in the case of an alloy containing 18 per cent chromium, 8 per cent nickel and the remainder iron, sintering at the same temperature for 10 or 12 hr. pro-



(a)



(b)

FIG. 4—(a) This alloy of 50 per cent iron and 50 per cent nickel was made from metal powders, sintered for 100 hr., at 2192 deg. F. (b) This 50 per cent iron and 50 per cent nickel alloy is wrought material, annealed for 20 hr., at 2192 deg. F. Both specimens were enlarged 100 diameters.

duces an alloy of low density, with fair oxidation and corrosion resistance. However, the alloy is magnetic and even after several hundred hours of sintering is still more magnetic than the wrought material of the same composition. This means, of course, that in the case of this latter alloy there is not obtained the austenitic structure characteristic of this type of material. Such an alloy will, however, have oxidation and corrosion resistance properties as good as an 18 per cent chromium alloy, but the added nickel is probably wasted.

Another fundamental consideration in all metals is grain size. With few exceptions the most desirable materials are those of fine or relatively fine grain, and by means of powder metallurgical processes it is possible to produce materials having extremely fine grain size. It can be stated almost axiomatically that the grain size of metal parts made from powder is the grain size of the powders used in making the piece so that almost any grain size or size distribution desired can be secured. To the author's knowledge, there is only one outstanding exception to this, and that is in the case of high-nickel compacts after prolonged sintering at very high

temperatures. This one exception holds only partially in that grain sizes cannot be obtained from powder compacts as large as those from wrought materials, as shown in Fig. 4, unless cold worked after sintering, followed by annealing. Other examples of this fine grain size resulting from powder metallurgical practices will be brought out later.

There are five basic variables which must be considered in any powder metallurgical process, namely: (1) Particle shape; (2) particle size distribution; (3) forming pressure; (4) sintering temperature; (5) sintering time. These variables will be considered individually.

Particle Shape

The shape of the individual powder particles will vary according to the method of manufacture. For example, powders made by the carbonyl process are quite uniform spheres; electrolytic powders are generally dendritic; ball milled and stamp milled powders are generally very thin plates of irregular outline; sprayed powders are usually spheroids; and powders reduced from oxides are of almost any ir-

regular shape. For most applications the shape of the powder particle is rather immaterial since the forming pressures used are always sufficiently great to give plastic flow of the metal, except, of course, in the case of such materials as the carbides. There is, however, considerable evidence to support the contention that where porosity is important, as in the case of bearings and filters, a spherical particle gives a more uniform porosity; that is, the individual pores are more nearly all of the same size. On the other hand, it is undeniably true that an irregularly shaped particle tends to interlock better than a sphere, so that if variation in pore size is not important, somewhat better powder compacts might be attained from the more irregularly shaped particles. The thin flat plates resulting from stamping or ball milling are probably the most difficult to use since they have a far higher porosity, when loosely packed, than any other shape.

This question of particle shape, therefore, brings up the importance of the apparent density, compression ratio and hardness of the metal powders. The apparent density of a powder, as defined here, is a purely empirical figure but is, nevertheless, of considerable importance. Consider an iron powder, for example, made in one case so as to be uniformly spherical and in the other case made as small flat plates. If the screen analysis of the two powders is the same, a wide difference in their apparent densities will be found. This can be shown by the porosity of loosely packed particles; in the case of the spherical particles a porosity of from 38 to 40 per cent will be obtained while in the case of the flat plates porosities will be as high as 93 per cent. The importance of these figures is that, in die design, if a spherical particle is to be used, the die cavity may be much shallower than when flat particles are used and this difference in cavity size is reflected in the cost not only of the die but also of the press and in die life.

From this discussion of apparent density, the real meaning of compression ratio is at once obvious. Thus, for similar powders having the same screen analysis, the one with the higher apparent density will have the lower compression ratio. However, other factors enter into the concept of compression

ratio, such as the hardness of the metal particles and the degree to which they work harden during compression. Here, again, the use to which the powder compact is to be put determines the most desirable compression ratio. If very dense parts are desired, a soft powder that does not work harden appreciably is most desirable. This means a powder with a high compression ratio where the comparison of compression ratios is made on powders of the same shape and screen analysis. On the other hand, a very excellent means of controlling porosity where some voids are desired is to use a harder powder with a lower compression ratio. There are no fixed rules by which the proper powder can be selected

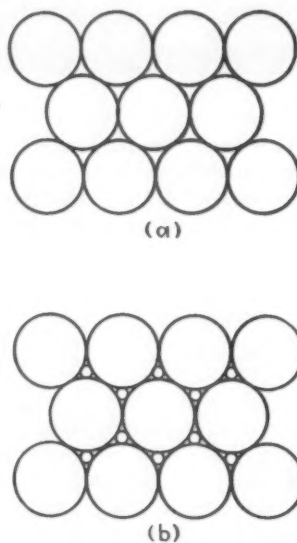


FIG. 5—(a) This type of packing of metal powder particles is obtained when particles are of uniform size and shape, showing the maximum voids. **(b)** When there is a wide size distribution in particles of uniform shape, this packing of the metal powder particles is obtained. This condition is one of a minimum of voids.

and generally some experimental work is necessary to determine the most desirable material. By the application of these few rules, however, it is often possible to narrow down the number of available powders very considerably. Examples of this will be shown.

Particle Size Distribution

In determining the porosity and size of the individual pores in a sintered piece, the particle size distribution of the powders is para-

mount. If a batch of metal powder in which all of the particles are exactly the same size and shape is conceived, and it is assumed that a die cavity is filled with such a powder, the loosely packed powder will fill the cavity in such a way that all of the pores are of the same size and shape as shown in Fig. 5a. This neglects any possible bridging of the powder to give a few isolated pores of larger size. Such an arrangement of the powders will give the maximum porosity possible for the particular particle size and this maximum porosity will carry through the pressing and sintering operations. Let it now be assumed that with the first powder is mixed another one also of uniform size and shape, but with the individual particles materially smaller than those of the first powder. If now this mixture is poured into the die, instead of the uniform pores previously obtained, the smaller particles will tend to some extent to fill in the interstices, so that the total percentage porosity is reduced. This is illustrated in Fig. 5b. By following this procedure the particle size distribution that gives the minimum porosity in the loosely packed condition is finally arrived at, giving a powder of maximum apparent density for any given shape. As in the case of particle shape, no fixed rule for optimum particle size distribution can be given. Generally speaking, the percentage of fines and their size is determined to some extent by the dies used. If a die is in good condition with very small clearances between the parts, a finer powder can be used than on an older die where there has been considerable wear. The use to which the powder part is to be put is also a governing factor, and, as before, some experimental work is always necessary to arrive at optimum screen analysis for any specific use.

Forming Pressure

The forming pressure used in making a powder compact is determined by several factors. In the first place, it is limited by the die steels available for use and by the capacity of the presses. On simple shapes of small area, pressures as high as 120 tons per sq. in. may be used if high speed production is not required. However, as the shape of the piece becomes more complex, the pressures that can be used must be lowered because of the limitations of allowable stress in the

die. Parts of large cross-sectional area generally require low forming pressures since the total pressure required of the press becomes exceptionally high. For example, a disk 6 in. in diameter pressed at 40 tons per sq. in., requires nearly 1200 tons total pressure. Since high speed mechanical presses are limited to about 100 tons total pressure, such a piece could not be made at high speed and a hydraulic press would have to be used. If this lower speed of production is not a limiting factor, however, pieces of large area can readily be made.

A second factor determining the forming pressure is the porosity desired in the final piece. Where high porosities are desired a relatively low forming pressure is used,

to make powder compacts that can be handled and even sintered under the right conditions, but to get good physical properties from such a piece is nearly impossible. However, if the forming pressure is increased sufficiently to rupture the oxide film and allow the clean metal surfaces to weld, a compact can be made having exceptionally high mechanical and physical properties in the pressed conditions and one which will sinter easily to sound, homogeneous metal. This welding of the metal particles is so marked in the case of aluminum that the compact often adheres to the die wall strongly enough to require destruction of the compact before it can be removed. Most of the soft,

forming pressure and were sintered together in hydrogen for 2 hr. at 1832 deg. F. Thus, forming pressure is another means of controlling the porosity of a compact.

Sintering Temperature

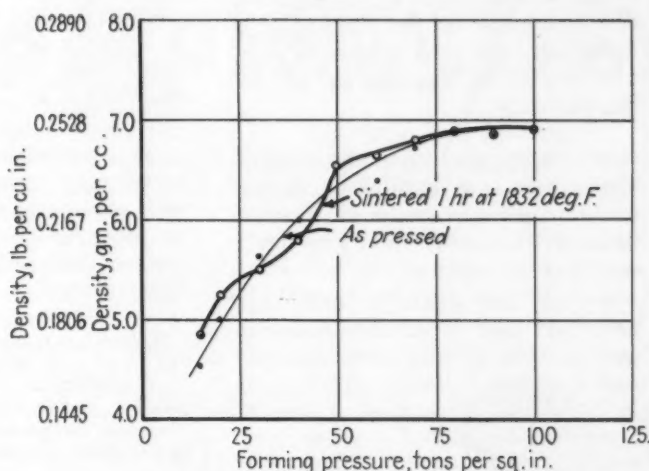
One of the most important variables in powder metallurgical practice is the temperature at which sintering takes place. As has been previously noted, the rate of solid diffusion is markedly influenced by temperature, so that for any given powder compact the highest possible temperature should always be used. In many cases the sintering temperature is above the melting point of one of the constituents so that a combination of sintering and impregnating takes place. The limitations on the sintering temperature are first of all economic since furnace costs, both as to first cost and operation, greatly increase as the operating temperature is raised. Another limitation is in furnace design. For small pieces, relatively few in number, it is quite easy to design a suitable furnace, but as the size or quantity of the pieces increases, it becomes necessary to build larger, more complex furnaces for operation at high temperatures and with atmospheres of sufficient purity for powder metallurgical work, which are extremely difficult to design.

The effect of variation in temperature on the final density of sintered nickel is shown in Fig. 7. From this curve it is quite apparent that the nearer the sintering temperature approaches the melting point, the higher will be the density. In this case, not only does the higher temperature increase the rate of solid diffusion, but at the higher temperatures the metals are more plastic and will more readily deform to fill internal voids.

Sintering Time

It is difficult to differentiate between the effects produced by short time sintering at high temperatures and long sintering at somewhat lower temperatures. The effect of time at the sintering temperature on the density of an iron compact is shown in Fig. 8 and it will be noted that it is very similar to the curve in Fig. 7. Probably the most important consideration involved in selecting a sintering time and temperature are the economics of the operation. Generally speaking, it is possible to arrive at any re-

FIG. 6—The effect of forming pressure on the density of an iron compact.



and as the desired porosity is decreased the forming pressure is increased. The effect of forming pressure on the ultimate density of pure iron compacts is shown in Fig. 6.

A third consideration that helps to determine required forming pressure is the thickness of the oxide films on the metal particles. In the case of metals with little or no oxide film, relatively low pressures will give adequate surface contact, so the solid diffusion can take place most readily. In the case of metals with a fairly thick or tenacious oxide film, the higher pressures are an aid in the rupture of the films and the cold welding of the clean metal surfaces. An outstanding example of this effect is in the pressing of aluminum compacts. Aluminum powder, particularly that relatively free of oil films, is covered by a rather thick and very tenacious oxide film. Using low forming pressures it is possible

low melting point metals exhibit this characteristic.

Another factor governing the forming pressure is the hardness of the particles and amount of work hardening they undergo. Obviously, a soft powder that does not appreciably work harden will require a lower forming pressure to arrive at any given density than a harder powder or one which work hardens appreciably. Thus, a well annealed electrolytic iron powder pressed at, for example, 40 tons per sq. in., will give a more dense compact than an unannealed powder compacted under the same pressure. The actual difference found in two such powders is that the annealed electrolytic powder has a density of 0.242 lb. per cu. in., or 6.7 gm. per cc., while unannealed electrolytic powder has a density of 0.220 lb. per cu. in., or 6.1 gm. per cc. In the instance cited the powders had the same screen analysis, were pressed using 40 tons per sq. in.,

sultant compact condition by either high temperatures and relatively short times or by lower temperatures and longer times and the economics of each particular operation will determine optimum conditions.

From the foregoing discussion of some of the fundamental factors influencing the production of powder parts, it is of some interest to see how well the rules laid down can be used to select, in advance, the type of powder to be used, thus cutting down the amount of experimental work necessary to arrive at a final decision.

For the following illustrations iron powders will be considered, although factors pertinent to iron will also be applicable to other metals. Now suppose that it is desired to make a simple shape of high density, large cross-section area, and at the greatest possible rate of production. For high density it is known that the powder must be annealed as a first requirement. Next, it must not work harden, which means that it must be low in carbon and low in such impurities as silicon and manganese. Since a large cross-section area of high density is desired, high unit pressures must be employed and a hydraulic press must be used. Since these presses are relatively slow as compared with mechanical presses, it is desirable to have as short a piston travel as

possible, which requires a powder of low compression ratio. To obtain this in a high purity annealed powder, an irregular or spherical particle shape with a wide range of particle sizes ranging from about minus 200 mesh down is required, with most of the powder minus 325 mesh. Now considering the require-

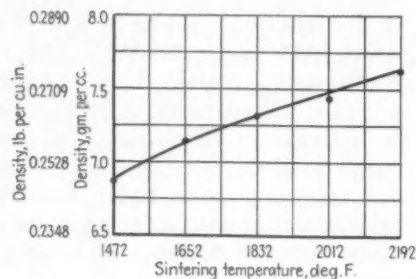


FIG. 7—The effect of the sintering temperature on the density of a nickel compact, with a forming pressure of 30 tons per sq. in.

ments set forth, either an annealed electrolytic iron powder or an annealed hydrogen reduced powder, probably the latter due to its lower cost, can be selected.

As another example, assume a final part that is small, complex in shape, with 20 per cent porosity and required in large numbers, is to be made. Following a line of reasoning analogous to the foregoing, a selection would be made

of a relatively hard powder of controlled shape, if possible, with a narrow particle size distribution and particles of somewhat larger size than before. The pressing would be done with rather low unit pressures in a mechanical press. In the first case the sintering temperature would preferably be 2012 deg. F., or higher, for from 1 to 2 hr., and in the second case the sintering temperature would be about 1832 deg. F., for 15 to 45 min.

While it is probably true that not all cases of powder metallurgical production can be analyzed as these two cases, it is almost always possible by the application of a few rules to decrease greatly the amount of trial and error type of work. Certain other methods of producing a specified result will be discussed here making it possible to go still farther in analyzing a production method before starting the work.

With this brief resumé of some of the fundamentals of powder metallurgy, practical applications and considerations of such things as die design, sintering atmospheres, and powder production can be examined.

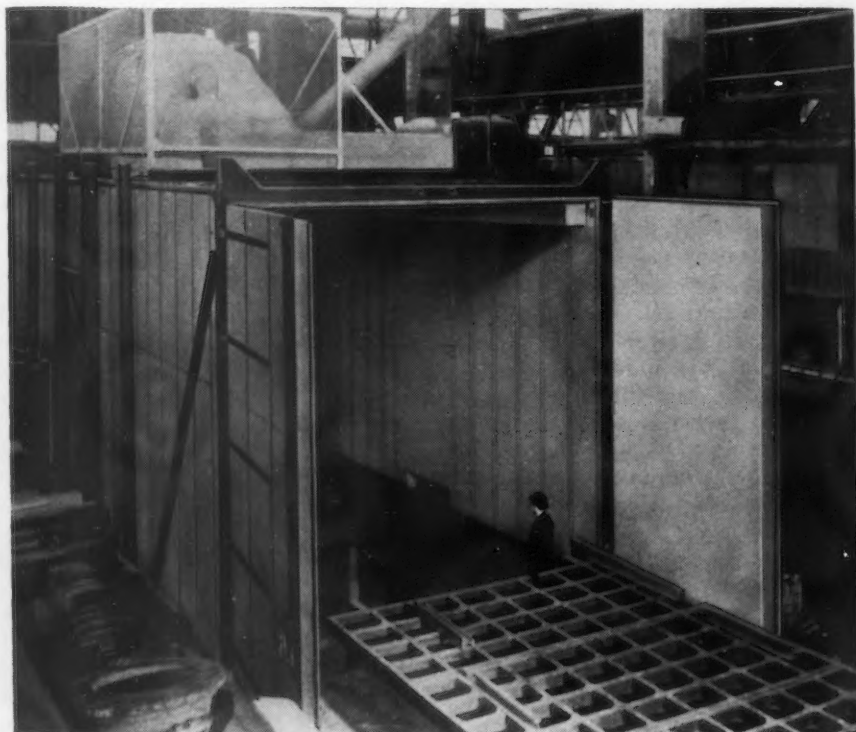
Editor Note: Next week, in concluding this article, the author discusses the practical applications of powder metallurgy, powder pressing dies and die design, sintering atmospheres and the effects of the addition of metal hydrides.

Mold Oven Handles 207 Tons per Load

ALTHOUGH originally designed to handle mold loads of 40 to 50 tons and deadweight loads of 100 tons of flasks and cars, this mold oven is currently being used to bake loads made up of 57 tons of molds and 150 tons of flasks and cars.

Built by the Gehnrich Corp., Long Island City, N. Y., the oven is 40 ft. long, 16 ft. wide and 17 ft. high. Wall, roof and door panels are packed with reinforced mineral wool insulation and are assembled in such a manner that there is no through metal.

Heat is supplied by an integral gas fired unit. Uniform temperatures throughout the unusually large area of the oven are provided by forced circulation through a network of ducts. The recirculating principle is used to heat the atmosphere.



Coining and Other Cold Press Work

By HERBERT CHASE

Engineering Consultant, New York

NUMEROUS jobs properly characterized as unusual if not unique are being produced by Bowen Products Corp., Ecorse, Mich. Much of the work involves what is well termed the "Coldflow" process as the plant specializes in cold coining work, although a large volume of work in forming, drawing and other more conventional press work is also done. Fig. 1 gives an idea of the character of items produced, most of which involve cold coining.

A great many parts are produced from bar rather than from sheet stock, but the work should not be confused with cold heading*, such

*For cold heading data, see THE IRON AGE, issue of Dec. 4, 1941.

as is done elsewhere on very different and highly specialized machines. Bowen employs chiefly conventional crank and toggle presses, the latter preferred for most coining since the longer dwell at the end of the stroke is favorable to producing the desired metal flow. Cold coining involves relatively high unit pressures and the use of correspondingly sturdy presses.

The plug shown in successive steps of production in Fig. 1, parts a, b, c, and d, and in the drawing, Fig. 2, is typical of one type of part produced. It is made from hot rolled, SAE 1010 steel sheet, 0.120 to 0.128 in. thick. More unusual is the two-armed hub, the successive operations on which are indicated by the numbered pieces, 1 to 10, in Fig. 1. This piece is first blanked and drawn from SAE 1010 hot rolled sheets, 0.156 in. thick. After

... Several unusual coining jobs being done by the Bowen Products Corp., Ecorse, Mich., are discussed herein, along with details of manufacturing processes and the high speeds of production.

annealing and pickling, five successive "cones" are drawn while the piece is advanced in a dial fixture. "Squaring" is done in a 200-ton press and this is followed by piercing the central hole, trimming, and

half-piercing or embossing the nibs on the two legs. Subsequently the piece is tumbled and inspected.

Square headed plugs like that shown as e in Fig. 1, are shown in the early steps of production in Fig.

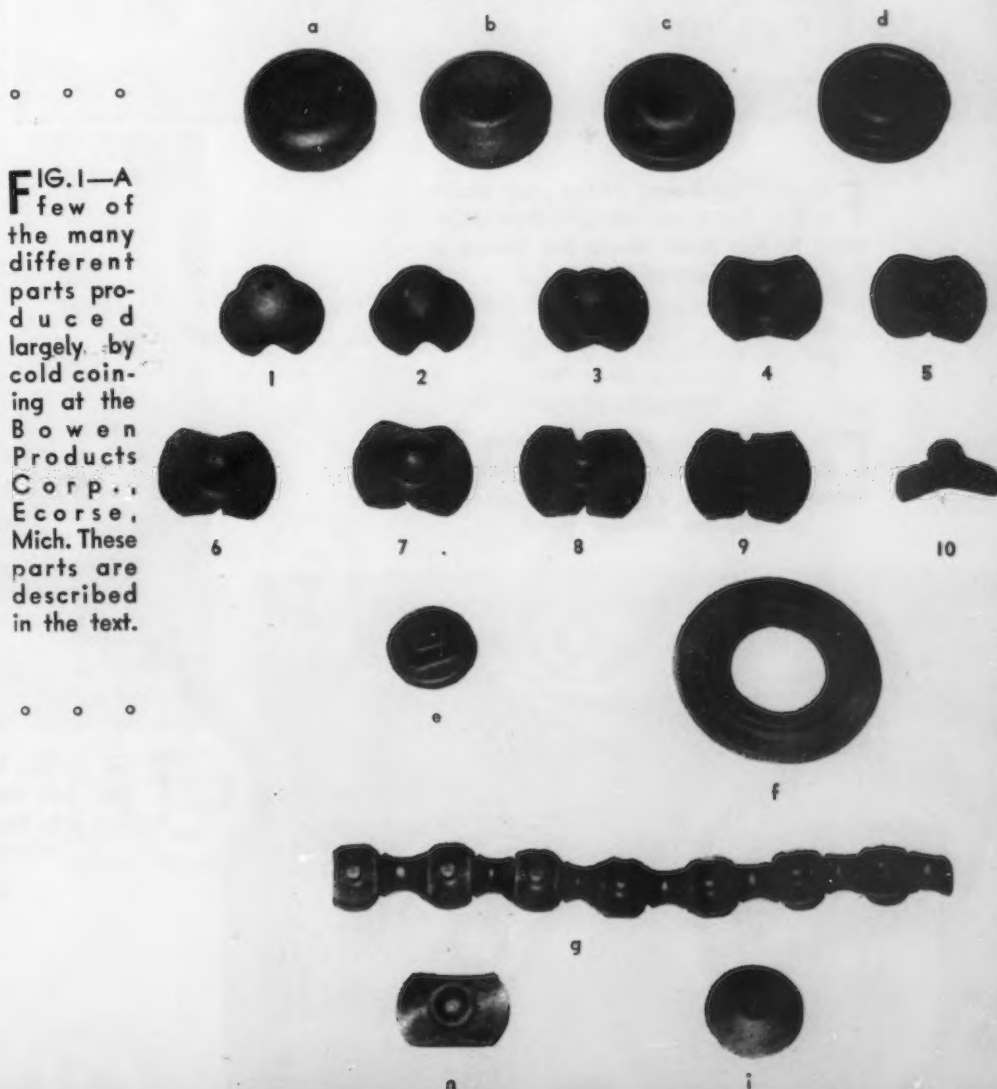
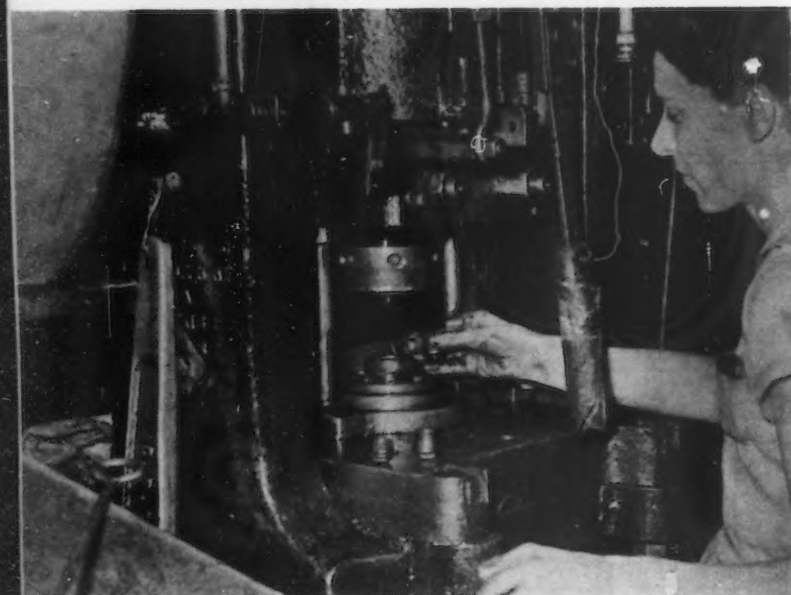
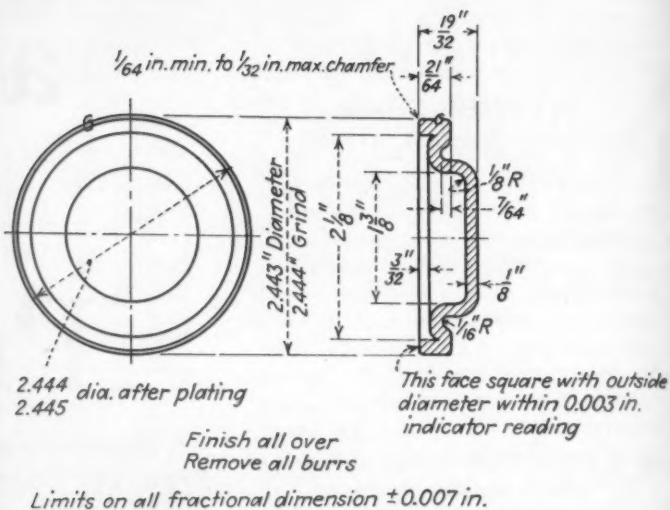


FIG. 1—A few of the many different parts produced largely by cold coining at the Bowen Products Corp., Ecorse, Mich. These parts are described in the text.



LEFT

FIG. 3—For forming the square head on cups, shown in Fig. 1-e, this dial setup is used. The cups are later formed into plugs.



ABOVE

FIG. 2—This plug is produced in the steps a, b, c and d. illustrated in Fig. 1.



ABOVE

FIG. 4—The barrel of the plug shown in Fig. 1-e is necked and then delivered to this press where the flange is formed on it.

o o o

BELOW

FIG. 5—The last of three coining operations in forming the hub felt retainers, Fig. 1-f, is performed on this 800-ton Minster press.

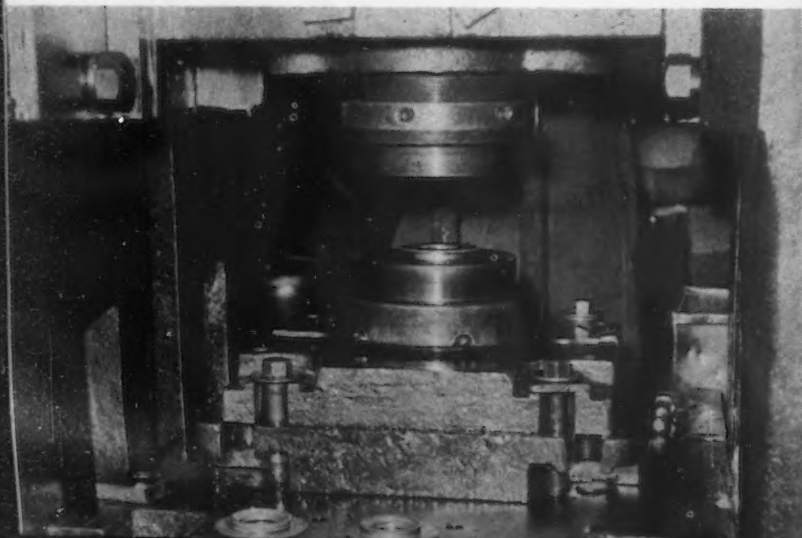


FIG. 7—The buttons shown as Fig. 1-g are made from bar stock in this press. The stock is advanced into the press by a hand-operated ratchet between the blows of the press.

3. After drawing, cup-shaped pieces are delivered to the large press shown in Fig. 3, and loaded on a dial fixture designed to index automatically in 12 successive positions, the press running continuously. The operator loads the cups over the punches carried by the dial. Three dies carried on the ram form the square head in successive operations, after which the piece is automatically kicked off into a waiting chute. These operations handle 700 pieces per hr. The parts are then delivered to a smaller press that necks the barrel and finally to a similar press, shown in Fig. 4, where the flange is formed in a squeezing operation at the rate of 900 an hr. The piece before and after each of the operations is shown in Figs. 3 and 4 in the foreground of the illustrations.

Flanged hub felt retainers, such as that shown as f in Fig. 1, have a conical bearing seat at the center and are coined with considerable flow of metal. Three coining operations are required, the final one being done in an 800-ton Minster press, shown in Fig. 5. Annealing is necessary between the coining operations, the final of which is done at the rate of 650 per hr., producing a piece that is remarkably smooth and accurately sized. A drawing of this piece, which is made of SAE 1010 steel, is shown in Fig. 6. The section shown in the drawing illustrates how the metal must be flowed to yield the marked variations in thickness that are required.

Buttons of a generally oblong shape with rounded ends, crowned on one side and having a short stem on the other, as shown in Fig. 1, marked g, are also among the parts coined in large quantities, starting with round bar stock. One of the presses and the die for producing these buttons are shown in Fig. 7. The stock is advanced by a hand-operated ratchet mechanism between blows of the press and issues in lengths with flash between each piece. The flash, of course, is sheared off in a subsequent operation. These parts are produced with a high polish, primarily because good metal flow requires a honed die surface, and they need no machining after flash removal. Parts marked h and i in Fig. 1 are produced in a similar manner.

Another part, shown in Fig. 8, produced in this instance from cold rolled bar stock, is a split washer with a serrated face and measures

FIG. 6—This is the part of the hub felt liner on which the final coining operation, illustrated in Fig. 5, is performed.

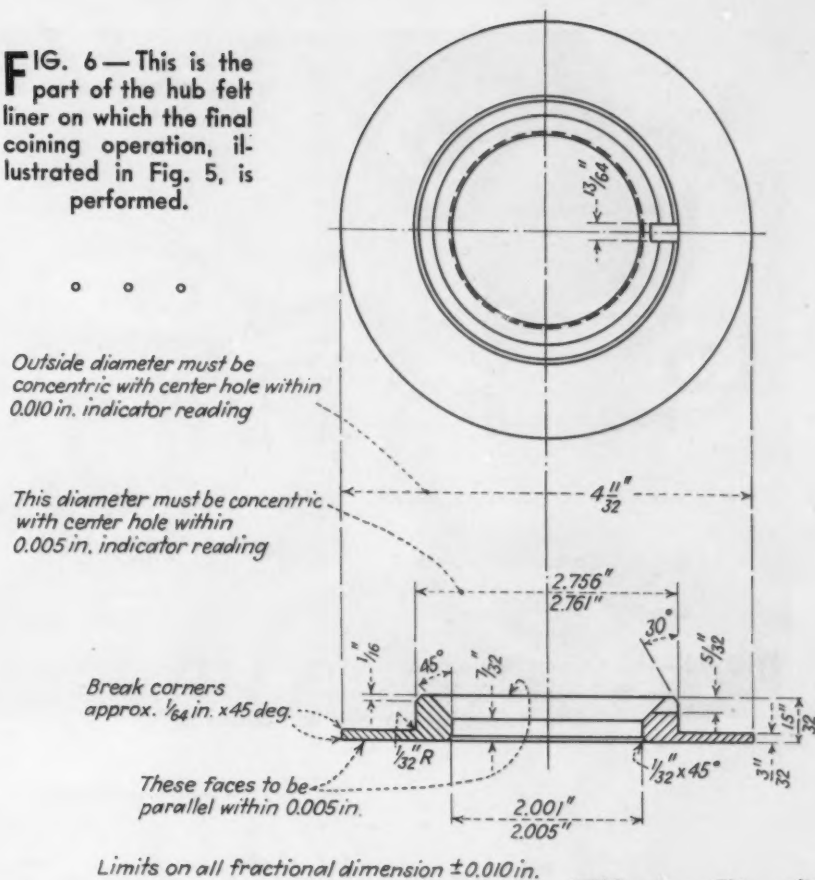
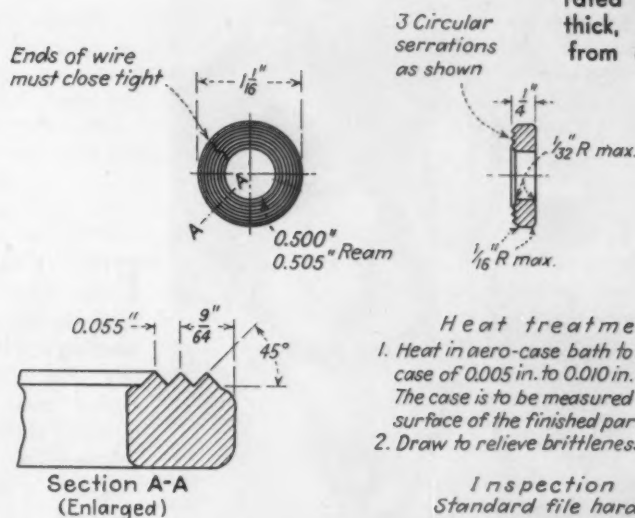
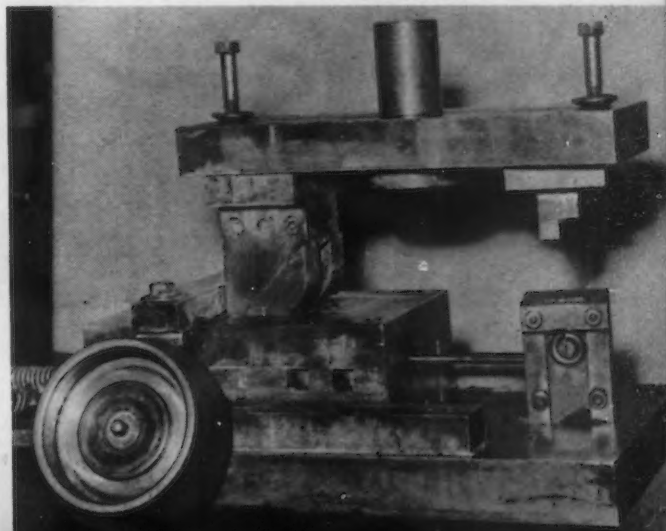


FIG. 8 — This split washer with a serrated face is $\frac{1}{4}$ in. thick, and is made from cold rolled bar stock.



.Limits on all fractional dimension ± 0.007 in.

FIG. 9—The machine used to punch out the split washer, Fig. 8. The circular die to the left receives the rings, which are struck by a punch, causing the ring to be flattened and flows the metal into the serrations of the die.



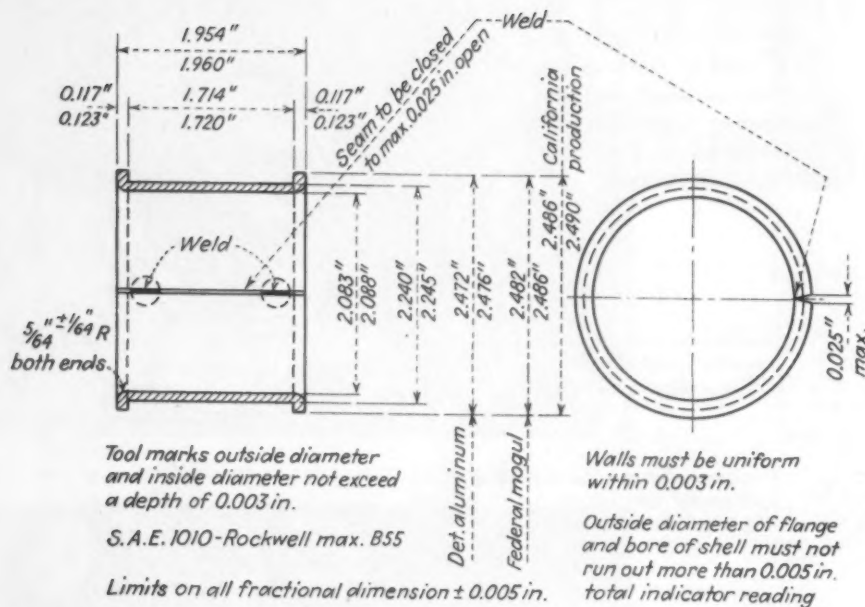


FIG. 10—This connecting rod bearing is made up and spot welded with two spots, as indicated in the drawing. Later it is babbitted and cut into halves, giving two half-bearings.



FIG. 11 — The flat stock used to make the connecting rod bearing, Fig. 10, is curled over the mandrel shown in this machine. The mandrel is reciprocated by the lever in the operator's hand to eject the piece after curling.

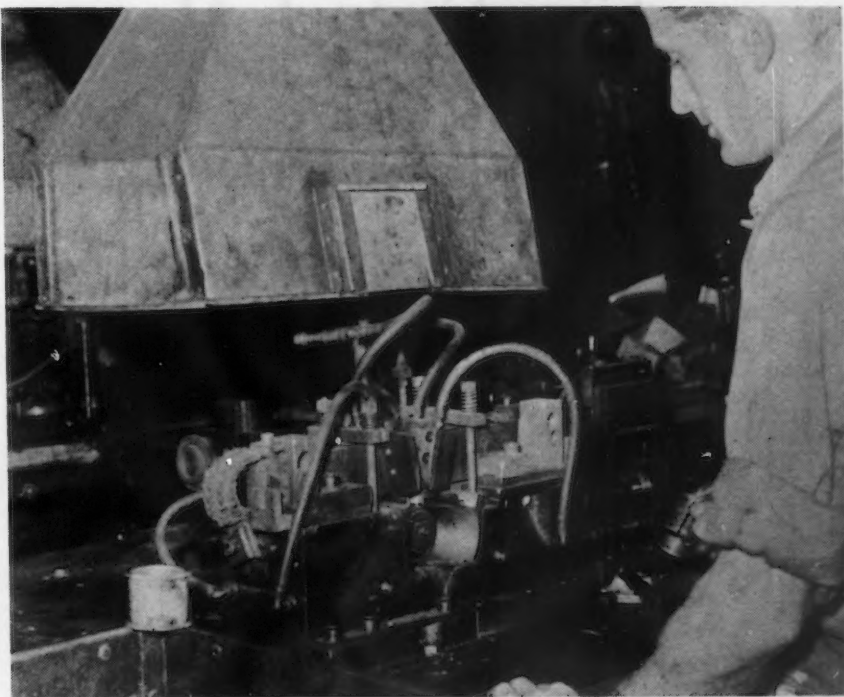
$\frac{1}{4}$ in. in thickness. Formerly, this part was punched from sheet stock and embossed to form the serrations, but the waste in stock was too great for its very low selling price. Consequently, the dies shown in Fig. 9 were developed to make the washer from bar stock with practically no metal waste.

The punch portion of the first die, shown in Fig. 9, has a cam for advancing the stock horizontally as it is gripped by two pairs of serrated arms. This advance of the stock forces the latter to curl around a pin in a helix. The punch also carries a tool that shears off one turn of the helix at each stroke. Subsequently, the turns or rings are fed, one at a time, into the circular die, shown at the left of Fig. 9. The rings are struck a blow by a punch that causes the ring of stock to be flattened and flows the metal into the serration of the die, producing the required serrated surface. Production in large quantities is very rapid and highly economical.

A curling operation is involved in producing the backing for the connecting rod bearing shown in Fig. 10. This part is made complete to the dimensions shown in the drawing. Formerly the bearing was produced from sheet stock, the blank then requiring forming and multiple coining, as well as trimming to size, a total of six operations. Now the blank is made in three operations from a rolled section, which is cut off, coined and trimmed. The blank is then curled around a mandrel, as shown in Fig. 11. This mandrel is reciprocated by a hand lever to eject the piece after curling. The operation produces 600 pieces an hr.

The curling, naturally, leaves the piece with a small gap that must be closed and fastened by welding. A special machine, illustrated in Fig. 12, designed for this purpose does the welding. The electrodes for resistance welding at two spots only, and not completely across the joint, are pressed downward against the piece automatically as jaws close around the piece and force the joint to close, shaping the bore around a mandrel. A toggle mechanism operated by an air cylinder locks the piece before welding and the machine operates so rapidly that 500 pieces an hr. are handled through it. As the drawing, Fig. 10, indicates, the joint is not completely closed through its full radial depth, but this is of no significance

FIG. 12—This resistance welding machine grips and closes the connecting rod bearing ring around a mandrel, at the same time pressing two electrodes against the work to effect the two spot welds.



since the shell is subsequently sawed apart on a diameter through the joint to give two half-bearings. Before sawing, however, the bore is accurately sized by striking the piece in a die as it is held over a mandrel. The customer coats the interior of the bearing with babbitt metal before sawing it into halves.

These are just a few jobs representative of what is being done in this plant, but they give some idea of the character of the work that Bowen Products Corp. is turning out economically and with great precision.

Aluminum Scrap Conservation

IN the December issue of *Sheet Metal Industries*, London, A. J. T. Eyles presented a number of observations on aluminum scrap conservation. As there is now a large tonnage of aluminum and aluminum alloy sheets used in the construction of aircraft, there is produced a corresponding amount of scrap in the form of sheet clippings, punchings, and turnings.

In melting aluminum scrap it is doubtful whether any but the largest and most experienced refiners average more than 75 per cent recovery from the ordinary dirt-laden turnings and chips of the general engineering workshop. If it be assumed that the average recovery from turnings, chips, and foundry waste is 70 to 75 per cent on the metallic basis, and if, as is shown to be the case, turnings and chips kept perfectly clean and properly melted will give 90 to 95 per cent recovery, then 20 per cent of aluminum is unnecessarily lost. Thus, it may be safely said that much valuable metal is lost through the low recovery in melting down aluminum scrap.

Aluminum is peculiar, its properties being different from those of brass or bronze. When melted it

oxidizes readily, and the oxide, being practically of the same specific gravity as the aluminum itself, does not float to the top of the metal, but intermingles with the metal and remains in it when poured.

Feeding aluminum scrap into the molten electrolytic bath, as used for producing pure aluminum, is not practicable in the case of corroded and painted aluminum sheet or dirty clippings and turnings on account of the fouling of the rather expensive electrolyte. Briquetting methods tend to decrease the melting loss, the melting time, and fuel cost, and increase the ease of handling the scrap. However, briquetting involves expensive machinery and is only profitable to refiners handling large quantities of scrap.

Low recoveries in the usual methods of melting aluminum sheet clippings are mainly due to the difficulty in getting the tiny globules of molten metal resulting from the fusion of the very fine clippings and chips to coalesce when covered with a skin or layer of oxide and dirt. In order to promote coalescence, two methods of melting can be successfully applied:

- (1) The scrap is kept just above the fusion point and the globules made to coalesce by hand puddling, which breaks through the oxide skin and makes the globules unite;
- (2) by the employment of a flux which melts or dissolves the skin of oxide, producing clean globules which can unite. The latter method is based on the same principle as that of welding sheet aluminum, where fluxes composed of chlorides and fluorides of the alkalis or alkaline earths are used to dissolve the film of aluminum oxide.

It is well known that in the production of aluminum by electrolytic means the electrolyte consists of molten cryolite holding in solution about 5 per cent of alumina, this mixture having the lowest melting-point of the series at about 1679 deg. F. This temperature is far too high for use in the melting operations connected with scrap aluminum, and a flux to be useful in scrap melting operations must therefore consist of a mixture having a considerably lower melting-point than the cryolite-alumina solution. Such mixtures are obtained by the addition of chlorides or fluorides to the cryolite mixture;

[CONTINUED ON PAGE 128]

Six-Sided Press Speeds

Aircraft Production

TWO new six-sided hydraulic presses are now in production at Douglas Aircraft Co.'s blackout plant in Long Beach, Cal. They cut and form sheet metal airplane parts at vastly increased speeds, and still use and retain the operating advantages of the Guerin process, employing a rubber pad

which under great pressure becomes as hard as steel, and serves in the upper platen of a hydraulic press as a universal female die.

The presses were built for

Douglas at the Brooklyn plant of E. W. Bliss Co. Of 2500 tons pressure capacity, these hydro presses weigh approximately 375,000 lb., stand 25 ft. high, and occupy an area about 32 ft. in diameter.

In cooperation with R. A. Steinbauer, Douglas' superintendent of machinery, Earl Cannon and other hydraulic engineers of the Bliss company evolved the unique press, incorporating six loading tables for high speed operation. They designed a six-post press with radiating die slides, automatically controlled so as to eliminate a master operator and avoid all danger of misoperation due to human error.

A six-die slide press provides the same selectivity of die slide as on the four slide press, any one die slide being available for movement into the press independent of its relation to the preceding slide. It has the further advantage of permitting more men to load work, as many as four on each die slide if necessary. All die slides enter the press endways and there is ample provision for stock racks between the several die slides so that while two die slides have been added and while the loading capacity has been doubled, the actual floor space of the press is little more than that of the four-die slide press.

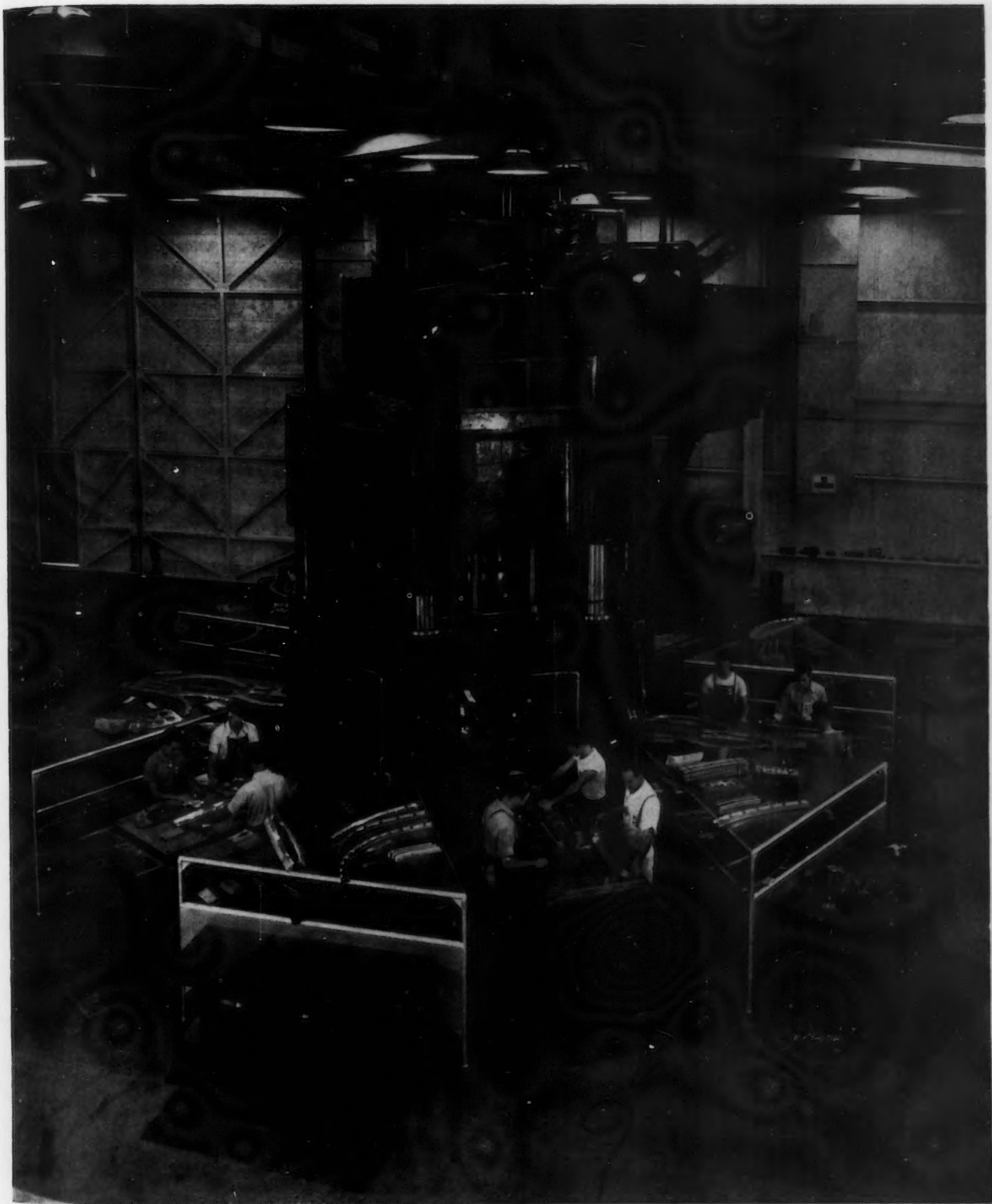
Since the slides all enter endways, they occupy different posi-

o o o

LEFT

NO child's play. Millwrights at Douglas Aircraft plant shown erecting one of six-sided hydraulic presses. Elaborate cribbing is required to get the unit crown and cylinder in place on top of the six strain rods.





● ● ● ONE of two huge and unique six-sided hydraulic presses now in production at Douglas Aircraft Co.'s blackout plant in Long Beach, Cal. Each of 2500-ton capacity, these presses have six electrically operated loading tables, and are said to be the fastest and most efficient units of their kind ever built. They employ the Guerin process for forming aircraft parts by means of metal male dies and a universal female die of rubber, a process developed by Douglas and now used throughout the aircraft industry under license.

tions within the press bed; hence the rubber pad must be rotated accordingly. This rotation of the pad is coordinated with the die slide action, and the control is so arranged that as the die slide enters the press, the rubber pad automatically and simultaneously rotates to proper position. If the diagonally opposite slide enters the press after a given slide has been withdrawn, the rubber pad remains in its original position, since one position suffices for either of the diametrically opposed die slides.

No specific order of die slide operation is required. The rubber pad swings left or right, as much as 60 deg. if necessary, to meet the incoming die slide. If the operation is in sequence, the rubber pad continues moving one station in either direction, the pad holder being capable of making a full revolution if necessary.

Featuring the new press is its ability to exert different pressures on the various die slides, each slide being provided with its own pressure adjustment so that if light pressure is desired on one pad, and a heavy pressure on another, the desired pressure is selected automatically. Each die crew can adjust the pressure for its particular slide without consulting other operators or interfering with the other five die slides.

An automatic cycle is provided so that when the starting button is pressed the die slide enters the press, and as soon as it and the rubber pad are properly positioned, the press ram descends at high speed. Change from this speed to the actual forming speed can be ac-

complished either before the press reaches the work or after contact is made. As soon as the desired pressure is obtained the press automatically reverses and returns to the upper position, at which time the die slide travels out to its loading position.

Slides may be pre-selected. If one die slide is in the press and the starting button is pressed for another slide, that slide remains stationary until the previous one has cleared the press. Then it automatically enters without further attention.

No master operator is provided, the die slides being so interlocked that only one can enter the press at a time. Each crew has its own starting button, to be controlled by the chief operator of that particular crew. Once a button is pushed, the other slides are inactive although a second button may be pressed to provide for the operation next in sequence. The press is also so interlocked that a descent is impossible until both the die slide and the rubber pad are in proper position.

Signal lights indicate which slide is in the press and which one has been selected to enter next. Safety gates are provided where each die slide enters the press. These gates are transparent and so arranged that if they are raised the press cannot descend, or if it should have already started, the press slide stops. The gates rise automatically as a slide enters or leaves, but prevent an operator from reaching into the machine while it is closing.

By a simple change in the con-

trols, the press may be set so that a second button must be pushed in order to cause the press to descend after a die slide is in position. This permits inspection of the work before the descent. This normally will be unnecessary, since in actual operation the movement of the die slide will be without any "shock" which might alter its position.

With this type of press, it should be noted that the sheet metal blanks are simply laid on the dies, which rest on the slide of their own weight. Shockless operation is provided by two-speed motors operating through a special "beaver tail" motion by which both the slide and rubber pad are properly accelerated and then decelerated as they approach the stopping position. Thus, if the work is properly located in the open position of the die slide, it will remain in precisely the same position when the die slide is in the press.

For hand control of the press, a switch can be thrown to separate the several functions. When this is done, the upper dial or pad holder may be operated through a cycle in either direction by pressing the desired push button. Operation of one station at a time, or continuous operation can be obtained, depending on whether the proper control button is depressed momentarily or is held down.

Each press is equipped with nine electric motors, the main unit having capacity of 150 hp. Pressing speed of each press is 16 in. per min., with a rapid advance of 310 in. per min. and return speed of 260 in. per min.

Ladle Cooling of Liquid Steel

ACCORDING to investigations of T. Land, reported at the Autumn general meeting of the British Iron and Steel Institute, Steel Casting Research Committee, it is now possible to control and measure with accuracy the temperature of liquid steel in the melting furnace. How the fall in temperature between tapping and casting is calculated, and how the metal in the ladle cools by a thin layer of metal passing down the vertical walls of the refractory lining, forming a reservoir of cool metal at the bottom, is shown by a simple

experiment. The effects of preheating the ladle are discussed, and the amount of heat extracted by the ladle refractories is calculated.

It was concluded that, to get efficient preheating, the preheating period must bear a definite relation to the time elapsing between the tap and the cast. The results of the investigations are shown in the form of a table, giving the drop in temperature for different sizes of ladles and different times of casting and tapping. The effect of varying the tapping temperature and the ladle preheating tempera-

ture can be allowed for by multiplying the figures in the table by a simple factor. A second table gives corrections that may be applied for different casting methods and for the time that the metal is held in the ladle between tapping and teeming.

The theory outlined by Mr. Land goes far in explaining certain unexpected results in observed teeming temperatures. Conditions for obtaining uniform casting temperatures are outlined, and an appendix summarizes the mathematical approach to the problem.

More Production From Old Machine Tools

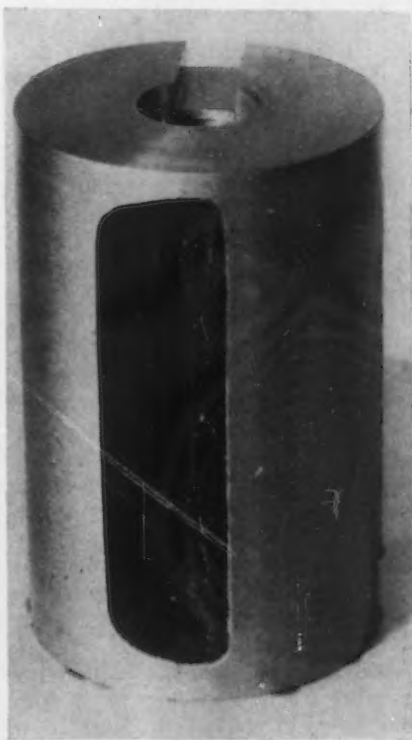
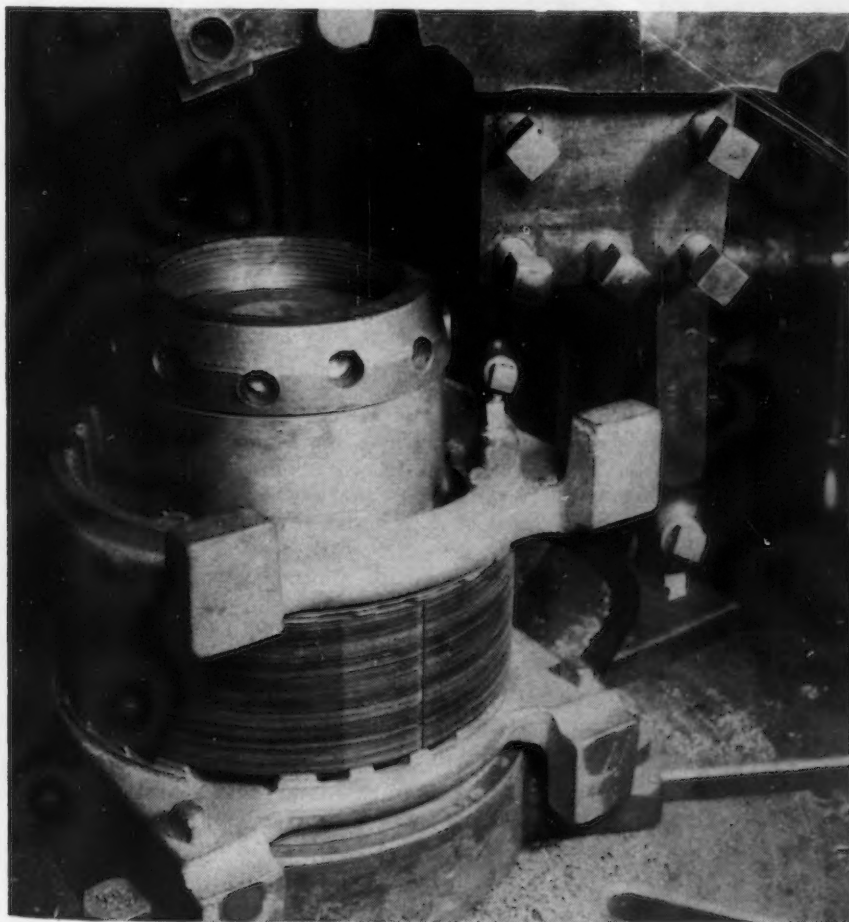
ACTUALLY, use of existing equipment, which quite frequently is almost entirely 15 years or older, is about the only way most small shops can ever hope to participate in the war program. Yet, a number of shops in this position have been told their old equipment is too slow to compete profitably in the close bidding on either prime contracts or subcontracts.

Old machines are sometimes handicapped by not having enough power, but more often the limitations are due to the restricted number of speeds available. The problem of adequate speed is often met by putting the larger diameter work on the slower machines. Then, too, many smaller shops do their steel turning on the slower machines, and leave their cast iron, bronze and aluminum work to the newer machines with higher speeds.

Application of cemented carbides to older machines has been held back not only because the higher speed ranges are not available, but also because many of these machines are not rigid enough, since chatter or vibration is often fatal to the relatively brittle carbides. In this connection, one of the newer contributions to faster cutting materials is a cast non-ferrous alloy which is not so vulnerable in the presence of chatter. Made by the Vascoloy-Ramet Corp., Tantung G is similar to an older cast cobalt-chromium base alloy but differs from it by the addition of tantalum carbide to the small amounts of tungsten carbide in both types. The tantalum carbide increases the resistance of the material to cratering action or chip erosion when cutting steel. It is a general purpose tool material in that it works equally

well on cast iron, and non-ferrous metals as well as steel. Like the cemented carbides, it is supplied in tip form brazed to tool steel shanks.

Advantage of using such a material on old machines is that slipping belts, excessive backlash in gears and interrupted cuts do not shatter the tools. Compared with the performance of high speed steel, production has been increased by as much as 50 per cent on lathes and boring mills up to 30 years old. Pieces per grind of tool have been increased from 12½ to over 700 per cent. These gains have been due to the abrasive resisting qualities of the material.



ABOVE

INTERRUPTED cuts on cast armor steel present a difficult problem for any tool. This job has been successfully turned with Tantung G tools on a 30-year-old American lathe.

LEFT

TURNING and facing bonnet seat of a motor frame. Speed was increased two-thirds and tool life doubled by changing the tool material, though an interrupted cut is made through cast iron and welded steel rod. The machine is a 26-year-old boring mill.

... Rectifiers in HardC

PRODUCTION in this country is rapidly swinging to munitions of war, hence the assignment of new equipment in the electroplating field is allocated primarily to such items as corrosion resistant coatings, the electrodeposition of bearing metals on steel, bonding rubber to steel by means of brass plating, masking parts with copper and tin prior to carburizing and nitriding respectively, the build-up of press-fit surfaces and the anodizing of aluminum. Together with these and similar activities should be included the extensive use of hard chrome for salvaging worn parts, building up undercut machined parts (thus avoiding complete spoilage of expensive products by errors of machining), providing wearing surfaces for dies, plastic molds and gages, and, in short, the application of this corrosion and wear-resistant surface wherever such characteristics are needed.

The volume of such electroplating is staggering. Even when the conversion of equipment formerly assigned to peacetime uses is counted upon, there nevertheless remains a tremendous shortage of equipment for the plating requirements of the war emergency. Then too, it should be remembered that a great deal of the existing equipment is not sufficiently convertible to justify its reapplication.

As the year begins, the industry is using a new approach in its consideration of equipment. Right now the most appropriate topic of conversation concerns the relative convertibility of machine tools, from their peacetime manufacturing applications to those of war, and

there is considerable wonder at the knots into which manufacturing capacity has been tied so that it could be economically assignable only to one location, one duty. Hind-sight being so much superior to fore-sight, there is cause for amazement at the failure to consider equipment in terms of its salvage value, its ability to be later reassigned to some other duty than that for which it was originally procured. And in general, engineers are promising to do better henceforth, particularly so long as the war may last.

Today, too much emphasis cannot be given to the importance of convertibility of equipment which must be procured from now on till the end of the war. Processes and policies will change. An electroplating operation that anodizes will be called upon to do hard chrome plating with the least additions of new equipment. Sources of plating energy will be moved into the heat treating room, with electrolytic techniques being used for descaling hardened artillery shells and for cleaning others. Men with the "know-how" will be moved from place to place, and if the equipment is sufficiently convertible, it will go along with them.

Presented herein are examples of the application of dry disk rectifiers instead of generators to hard chrome plating processes—considerations of convertibility and adaptability are beginning to impel the selection of dry disk rectifiers, rather than generators.

It is usual to build motor-generator sets to customer specifications, beginning construction only after the order is received. Ordi-

narily hitherto, an adequate interval has existed between the date of the customer's order and the deadline against which he must set his schedules, before which deadline all equipment will have arrived and been set up. In the procurement of electroplating equipment today it is noticeable that the long interval between order and delivery is no longer permissible. No longer must the need for a tool of production await the completion of build-ups and the arrival of all other equipment. This is a time calling for the immediate availability of new equipment to supplement machinery which has been released by cessation of other dispensable activities.

The item of delivery time has achieved such great importance that the need for generators is being filled in considerable measure by rectifiers, which can be manufactured rapidly, in standardized production, carried in stock and shipped where needed immediately upon receipt or order. For example, instead of applying one generator of say, 6000 amp., to one large hard-chrome tank, it is becoming fairly regular practice to bring together four 1500-amp. rectifiers to accomplish the same purpose. The four rectifiers may be simply paralleled, or the work can be divided into sections in the same tank, each with its own separately controlled source of energy, each section electrically isolated from the others as though the work were in separate tanks. Still another favored arrangement is to use separate tanks, each with its own controlled rectifier. There are decidedly important gains to be realized from the last mentioned arrangement.

Hitherto, hard-chrome practice has usually been to concentrate the work in one large tank, fed from one large generator. Current for the whole tank has been regulated by the field rheostat of the single generator. Quite naturally there are variants in the preferable

FORTY-THIRD in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

Hard Chrome Plating

By JOHN C. BOGLE
Udylite Corp., Detroit

method for work of differing size and conformation. However, in shops where all the eggs are in one basket, so to speak, very little in the way of selective treatment can be accorded those pieces which need individual attention.

As stated, there are gains to be realized in the selection of several smaller tanks, each with its own power source and control, rather than one larger tank. When generators are considered in this sort of arrangement, the extra cost per ampere of the smaller units, the extra cost of providing foundations and bus structures, has always militated against such division of load. The presence on the market, during the past few years, of several excellent rectifiers, however, has made such philosophy out of date.* Rectifiers of smaller size can cost even less per ampere than generators of high capacity, no foundation other than a floor is needed, and the rectifier can usually be placed so near the tank it is to feed that the bus all but disappears.

**For other articles on rectifiers for electroplating, see THE IRON AGE, issues of Sept. 11 and 18, 1941.*

With these smaller plating tank combinations, made possible by rectifiers not only physically but economically as well by rectifiers, each rectifier provided with its own current or voltage control, each with its own tank carrying, perhaps, its own particular concentration of solution and operated at its own temperature and current density, it is possible to give selective treatment to parts of differing shape, size and function, by assigning them to the tank combination best suited to their needs.

The rectifier has made possible the use of a standardized size of hard-chrome plating tank, with its own rectifier matched to its load requirement, its own ventilation system and, if desired, its own concentration of bath. With a rectifier standardized at an output of say

... Today, equipment must be flexible, easily obtainable, and equal to the mounting tasks required of it. Here is how these objectives can be obtained in the very important process of hard chrome plating.

1400 amp. at 6 volts, this tank should be about 4½ ft. long, 2½ ft. wide and 2½ ft. deep.

Hard chrome plating is not a trade or profession. It is an art. The plant engineer, the advisory expert, the "visiting fireman," none of these agencies can supplant the first-class chrome plater, backed up by his mechanic, who concocts and builds those weirdly shaped conforming anodes. It is here suggested, however, that this team of artists be supplied with equipment which is capable of the widest range of adjustment in order for them to be able to attack the problems that confront them day after day to best advantage.

The writer does not intend to enter any discussion of plating technique other than to say that there is virtue in making possible as many variations of current density, voltage, temperature and concentration as possible.

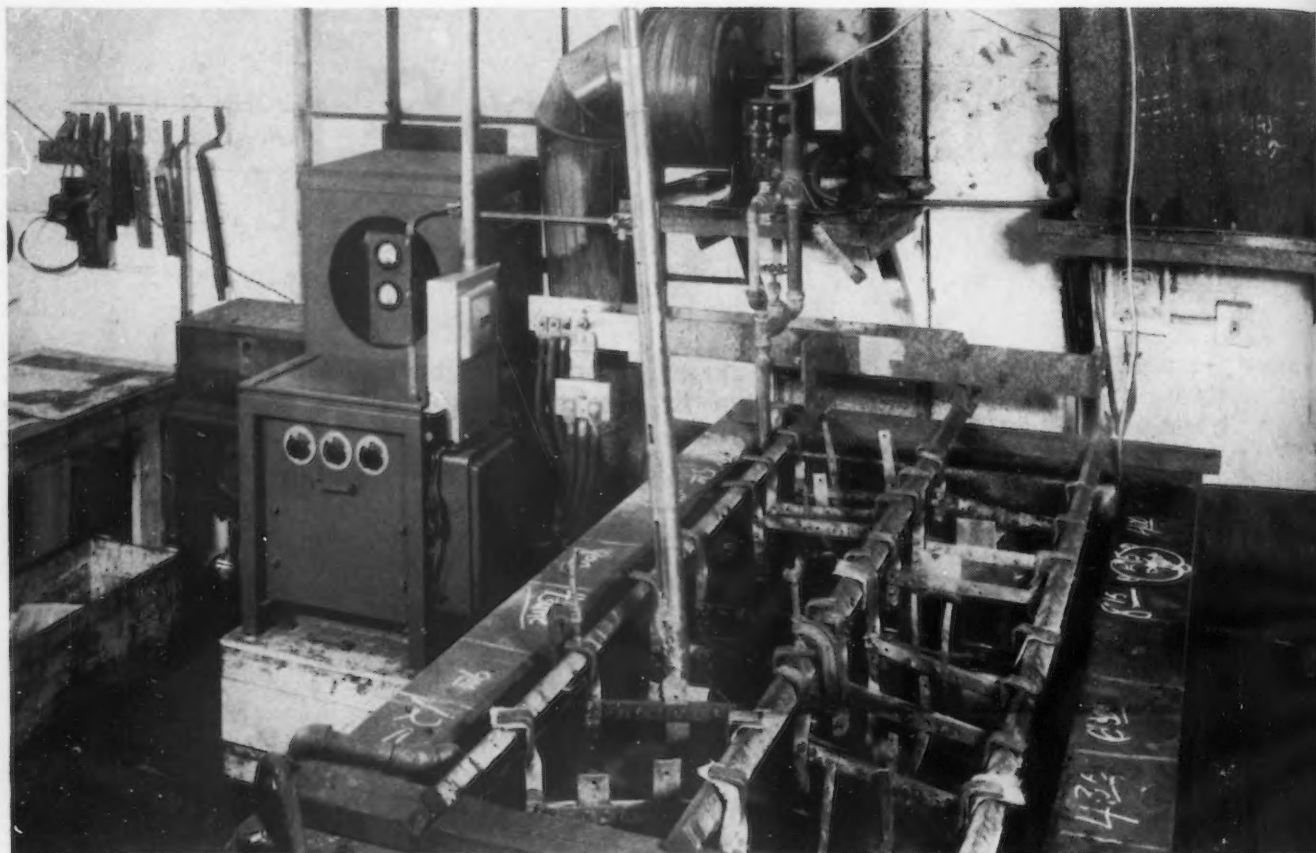
It must be realized, of course, that some pieces which are to be chrome plated are too long to enter a 4½ ft. tank and require larger tanks. This article is not intended to convey the idea that 1400 amp. represent the upper limit for tanks fed from rectifiers. When such larger tanks are equipped with individual regulators it is possible to apply as many rectifiers in parallel as is desired to handle the large part or many small parts. In many cases where rectifiers have been applied to existent tanks of large size, as many as three or four individual plating operations take place in a single tank, each at a different voltage yet with perfect control. It must be understood that with isolated sources of low-voltage direct current, there will be no interchange of current be-

tween the various sources, even though the parts to be plated are hung in the same tank without barriers.

The foregoing is offered to show that advantage can be taken of separate control of the two ends of a chrome tank fed from power units completely isolated one from another. It is even possible to cite a case where one power source is a generator and the other a rectifier, feeding separate parts of the same tank at different voltages and with no trace of mutual interference.

These gains in operation being somewhat novel and unusual in hard chrome plating, it might be well to mention several concrete instances where selective discriminatory voltages may be applied with profit. For example, consider a piece of high-carbon steel; after such a piece has been treated with reverse current, it is frequently found that microscopic bits of carbon appear at the surface of the work. The usual application of current in ascending voltages simply does not fit such a case. Instead the pieces must be "hit" with a jolt of energy at high current density to bridge the gap which otherwise would appear in the plated surface. (Fancy "hitting" a 10-ft. tank full of work in order to nurse a few such pet pieces.)

There is, for another example, the problem of getting new chrome to stick to old chrome. Naturally, if the old chrome surface is not continuous, it should all be removed before starting the process of plating fresh chrome, but frequently considerable time economy can be realized by superimposing new chrome on a continuous but



Individual rectifier, regulator and ventilating fan applied to a small, hard-chrome plating tank.

worn-down old chrome deposit. Apparently the trick involved is to bring the current on the work at exceedingly low voltages and increase to the proper voltage gradually. As a matter of fact, this process of applying incremental voltages is sound practice in a wide variety of applications, and it is impossible to do so consistently and economically without segregating the energy supply as above described.

If the volume of work which requires identical treatment is large enough to fill a 5000-amp. tank, the advantages which have been recited are not so obvious. But when part of the work is large, part small, part destined to receive 0.007-in. plate and part to receive 0.003 in.,

part of one basis material and part of another, it may be readily appreciated that it is better to split the area of work into several small units rather than concentrate it in one large one.

With familiar pieces which are to receive heavy deposits, the plater has found by experience some best routine of applying voltage, so many volts the first hour, so many ensuing hours at such a voltage and so on. Naturally, when he must compromise this selection of prime conditions in behalf of the rest of the work in a large tank, he is seriously handicapped.

The need for hard-chrome plating is growing. The most important part of any organization dedi-

cated to this work is the team of plater and mechanic already referred to. Fortunately, with such a slow process as hard-chrome plating, these men can spread their activities considerably by the addition of less skilled help, so no bottleneck appears here. As for the other factors which might slow up expansion, there is the matter of how fast the capital account of a relatively small organization can be expanded, and here again the advantage of adding the smaller units, one at a time, is apparent; for with small tanks fed from their individual rectifiers, the investment can be held within safe bounds, and expansion made in perfect tune with the business in sight.

Aircraft Steel Specifications and Applications

THE Carnegie-Illinois Steel Corp., Pittsburgh, released within the past few days a new 75-page publication on aircraft steels entitled, "Steel Aircraft Materials and Applications." Following a description of "Why a Plane Flies," and "Plane Construction and Nomenclature," are steel applications in military airplane en-

gines, propellers, and landing gears.

To enable the purchaser to more readily recognize the various steel specifications, a section is also included that covers the Society of Automotive Engineers, Aeronautical Material Specifications, and the American Iron & Steel Institute designations of steel aircraft parts by structure and accessory, power-

plant and accessory, propeller, and land gear classifications. A separate list of parts made from various qualities of stainless steel is included, along with some of their physical requirements.

Photographic applications of the various steels described are shown and applications identified.

Power Hammers

Coming Back

POWER or so-called bumping hammers for sheet metal are coming back into use again, this time for both production and experimental work in the aircraft industry. These hammers were first used in the automotive industry in the days when production runs were small and expensive drawing dies were not warranted from the economic point of view. When automobile production runs assumed large proportions and practically all sheet metal body components were being produced on stamping and drawing presses, the power hammer was still retained for custom body work and for forming experimental jobs.

Much later, in 1936, when the house trailer industry was about in the same stage as the automotive industry was in the early 1900's, a few power hammers were being used to shape roofs and bulbous front ends. These hammers were operated by men who had gained experience in custom body shops.

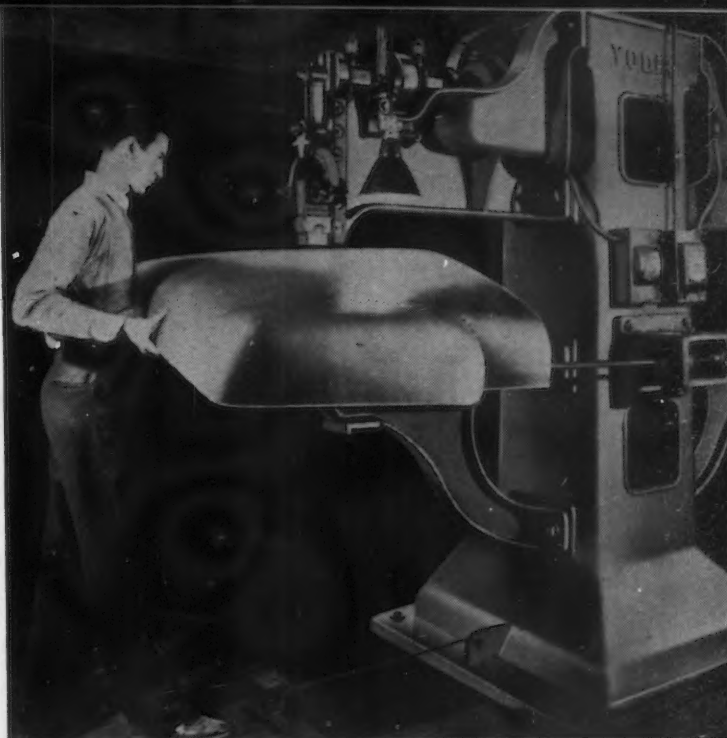
When the aircraft industry first changed from cloth-covered surfaces to stressed skins made of sheet duraluminum, compound shapes were formed by hand hammering of the sheet over wood forms or even sand bags. This was a slow and tedious process at best. The next step was the use of the power hammer with which it is possible to strike 600 to 1200 blows per min. as compared with 100 blows per min. by hand. Then, as has been pointed out in a previous article,* the aircraft builders went

*"Job-Lot Aircraft Stampings," *THE IRON AGE*, Oct. 19 and 26, 1939.

to the use of rope drop and air drop hammers, hydraulic presses with rubber pads for blanking and forming, the stretching press and the shrinking machine, not to forget conventional stamping and drawing presses, many of which used low cost dies of wood and plaster.

Many of the parts formed in drop hammers and with rubber pads have a tendency to spring back and have to be corrected by hand hammering.

FORMING a curved metal top section with a Yoder power hammer. Intensity of the hammer blow is governed by changing the length of stroke of the adjustable crank by means of a slotted drive head. Connection of the crank to the hammer is through a link and multi-leaved spring, similar to a small automobile spring, with leather strap connections from the spring eyes to the hammer carrier.



Often in drop hammer work, withdrawal of the work from the dies and some hand hammering over forms are necessary before the piece is worked down fully into the drop hammer die.

The power hammer is now being used as an auxiliary tool to both processes. Today, there are some 200 hammers producing skins and cowlings and finishing parts that have been initially formed with wood dies and rubber pads. This combination of the two techniques reduces the amount of initial hammer work and gives the operator a key to the finished shape of the part so that he can proceed immediately with the hammer work without too great an amount of planning.

Shaping of sheet metal by hammering depends on the plastic flow of metal and thinning of the sheet. If an area in the center of a square sheet, for example, is struck a repeated number of blows in rapid succession over an appreciable area, the sheet is thinned locally and the area increased. Since the edges of the sheet are constrained, the increased area in the middle is reflected in the form of a bulge. The action is hastened if the edges of the sheet are thickened by using a lower anvil with a tapered V-shaped depression in one side, with a corresponding wedge on the hammer die. This part of the tool puts a crimp in the metal, which can be later smoothed out, but which will still result ultimately in thicker metal.

If a narrow strip is hammered down the middle, the strip tends to

conform to a curvilinear shape with a crowned cross-section.

Control of final shape is usually obtained by matching the formed sheet against a wood template. For lightness and ease of construction, the three dimensional template is not made of solid wood but is composed of a honeycomb construction, the contour being formed on the exposed edges of the cross ribs at right angles and of the surrounding box frame. Such form grids have been used for a number of years in welding sheet metal subassemblies in auto body work. The hammer operator judges from this pattern the amount of crown desired in the sheet and marks the location of the crown with a colored crayon so that he has a guide for beginning his work.

The sheet is then placed between the hammer dies so that the location of the maximum crown is directly under them. Then the hammer is started and the operator, using a longitudinal and then a transverse motion, forms a crown or bulge in a localized area, and gradually working back into the remainder of the sheet, develops a crown which fades out at the edges. The operator keeps checking the shape against the template grid, but if a considerable number of parts of a single shape are to be made, the operator soon is able to visualize the exact shape he is working for and does not find it necessary to fit the part to the template until he has almost completed his work.

Template Manufacture

... A new template duplicating process developed by Britain's Westland Aircraft Co., Ltd., described in Aircraft Production, London, is said to speed up template production as much as 80 per cent.

LAYING out templates by mold lofting methods is a technique of which aircraft manufacturers in England have made increasing use during the last two or three years. An adaptation from shipbuilding practice, with which certain aspects of aircraft work have much in common, lofting consists of laying out full size sections and contours of the airframe which have been prepared necessarily to a much reduced scale on the drawing board, as shown in Fig. 1. A large floor is used, especially prepared for the purpose, and the design lines of the components are laid out upon it for aero-dynamic proving and fairing. Contours of particular sections, such as rear

fuselage frame sections, are extracted in the usual way by projection from the waterlines and buttocks to produce hand-scribed master templates.

In using this method it is frequently possible to work from a general sketch supplied by the drawing office and to settle details of clearances and rivet disposition on the full-size layout in the loft. Much drawing office time is saved and there is a greater degree of certainty in the result. Also, subsequent working to prints, with all the possibilities of error involved, can be largely eliminated as the departments concerned can use a template prepared from the full-size layout in the loft. Lofting is now

regarded as an essential intermediary stage between the design office and the shops and, in consequence, the rate at which templates can be produced, largely governs the rate at which a prototype aircraft of a new design can be completed.

The problem of reproducing templates for use in the shops from the master layout is, perhaps, the main difficulty involved in lofting, particularly where several copies may be required that, to give satisfactory results, must be identical within very close limits. Hand copying, the only method originally available, is tedious, far too slow, and subject at all stages to errors of transcription. The subsequent process of finish-filing the rough-routed blanks to accurate limits by hand also absorbed much time and skilled labor.

This will be appreciated when it is realized that the size of the sheets may be as large as 8 x 4 ft., although smaller sheets of 6 x 2 ft. are more commonly used. Also, it is necessary to use mild steel for production copies, as against aluminum for the master templates, in order to avoid errors due to buckling and rough handling, which might occur in the shops.

Various methods of copying have been evolved, and the methods adopted by several American aircraft companies have already been described.* In England the Westland Aircraft Co., Ltd., has re-

*See descriptions of photographic process, THE IRON AGE, issue of Oct. 10, 1940; Aircraft Production, March, 1941.



Fig. 1—Laying out a master template on the mold loft floor.

cently evolved a process which is at once accurate, rapid and cheap. Although very simple in principle, this method was not adopted without extensive research having been made into other possible processes.

Photographic methods, employing various media for direct and indirect copying from the master template to the copy template, were investigated, but were finally discarded because of the expensive special equipment required and the comparative inaccuracy and instability of the results. A satisfactory method was ultimately devised, which in essence is direct pressure, contact printing through the medium of printing ink.

In considering the problem certain essentials had to be borne in mind. The master template must have a uniform surface capable of being coated uniformly with dark ink so that extracted lines scribed upon it would stand out clearly.

This was achieved by surface-etching the aluminum sheet of the master template in a 15 per cent aqueous solution of caustic soda at a temperature of 338 deg. F., and washing in cold water. In this way a matte finish is produced on the template sheet, which then readily takes an ink coating, and the scribed lines on this master become clearly defined when the ink coating is applied, as shown in Fig. 2. No elaborate apparatus is necessary to carry out either etching or



LEFT

FIG. 2—A roller is used to ink the master template in readiness for duplicating.

RIGHT

FIG. 4—Shaping the template on a filing machine. To obtain the greatest possible accuracy, the operator sights the contour lines through a magnifying lens.

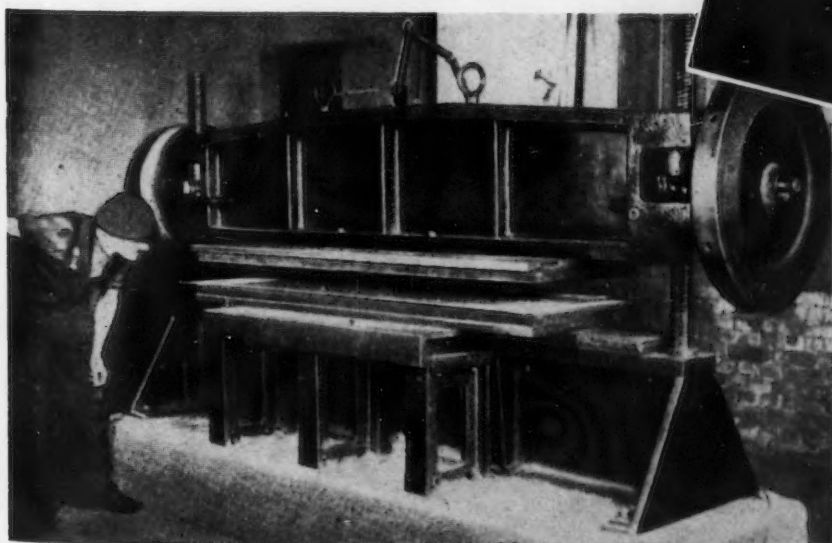


FIG. 3—For duplicating, the inked master and the copy template are placed between rubber-faced platen on a power operated screw press, much in the same manner as a press proof is pulled from a type form.

inking. Inking is done with a roller, the method being similar to that of taking a proof from a type form.

The surface of the copy template must be then smooth and light in color so that the transference to it of the design lines from the master template will be even, and they be thrown into relief. This requirement is met by spraying the copy

template sheet with dope-resisting white paint after it has been surface etched in the manner described above.

For the actual copying process, pressure must be applied to the two plates in such a way as to give even and intimate contact. For this purpose, two heavy planed steel platens each 6 x 2 ft. are rigged on a simple power-driven screw-press, illustrated in Fig. 3. To each of these platens is affixed a rubber pad 1½ in. thick, the purpose of the latter being to insure uniform contact over such a comparatively large area. Uniform contact is more essential than sheer heavy pressure on the plates.

Having obtained an accurate reproduction of the design lines, the cutting of the template to contour

must be done accurately. On this point it became evident that hand filing could be eliminated in favor of filing the roughly-routed template on a rotary chain-filing machine. By the use of a magnifying lens directed onto the scribed lines, as shown in Fig. 4, an operator on such a machine can obtain far better results than by hand filing, this process being confined merely to smoothing off the template. A high degree of accuracy has been obtained by semi-skilled operators working in this way.

Design lines reproduced in this manner on copy templates have proved to be sharp and clear, and the possibility of inaccuracy in reproduction, which formerly was present, has now been removed. One of the decided advantages of

the method is that the plural extractions of sections usually scribed on the one master template may be speedily reproduced one by one from this same master.

In general, the adoption of this simple method of producing templates has saved a great deal of time and an average reduction of from 70 to 80 per cent has been made possible in this direction. In one recent case a series of copy templates was produced ready for routing and filing to shape in one hr., whereas the method formerly employed would have required 12 hr. to obtain the same result. It will be appreciated that the resulting cumulative saving in time is of great importance in prototype construction.

Salvaging Heat from Quenching Oil

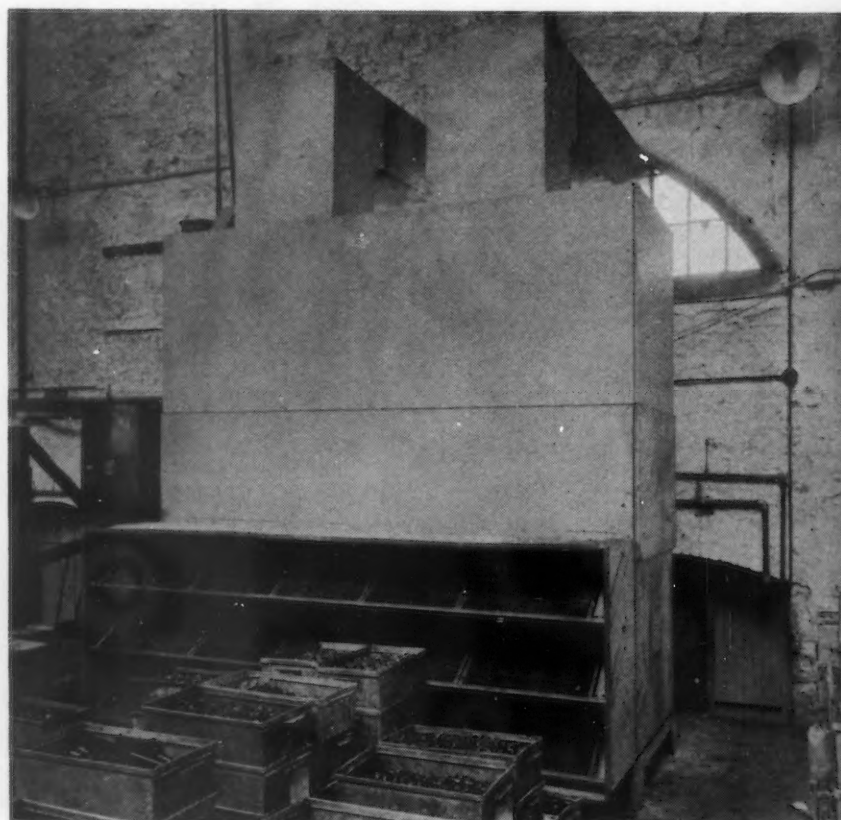
IN continuous heat treating installations, one of the problems is to get rid of the heat constantly being brought into the quenching bath by hot work. Most coolers employed simply waste this heat. A thrifty bolt and screw manufacturer in Pennsylvania is making use of this heat, however, to provide warmth to his factory in winter.

In this particular plant, work is heated in a gas furnace up to about 1700 deg. F. and then is dumped into oil vats at the rate of 2000 lb. per hr. The quenching oil is maintained at a temperature of 140 deg. by circulating it through a model 7D Trane "Climate Changer," a form of air conditioner which would ordinarily have had a steam or brine passing through the finned coils. In this model five two-row 30 x 90 in. coils are used. Oil is pumped through them at the rate of 200 gal. per min. and air is blown across them at the rate of 16,000 ft. per min. Three banks of filters, seen in the photograph, are used on the suction side of the fan inasmuch as there is a rather dusty atmosphere in the plant.

Two direction nozzles are used on the Climate Changer, which permit

the air to be discharged outside during summer and inside during the winter months when heat is re-

quired. This arrangement, of course, appreciably reduces plant heating costs.



Load-Center Power Distribution Favored

INDUSTRY'S rapid wartime expansion and the need for conserving strategic materials have given added significance to the substantial time and material savings and to the operating advantages made possible by the load-center form of power-distribution system applicable to industrial plants, shipyards, and naval and military projects. The universal application of this system in all expansions proposed and under way for 1942, it has been estimated, would mean that upwards of 5,000,000 lb. of copper and steel, largely in cable, could be diverted to other vital production requirements, it was brought out in a paper presented before the American Institute of Electrical Engineers on Jan. 30 by D. L. Beeman and R. H. Kaufmann of the General Electric Co.

In load-center power distribution, high voltage power is distributed directly to the production area, or load center, and is there stepped down to the voltage at which it will be used. Short secondary cables then feed the power to motors, lamps, and other power utilizing equipment. Where the total power load of a plant or building exceeds about 1000 kva., several small load-center unit substations are used, distributed throughout the plant each near the center of its load area. Conventional distribution systems usually employ a large substation to transform large blocks of power from high voltage (2300 to 15,000 volts) down to the voltage at which it will be used. Long, heavy, low-voltage power cables then distribute the power throughout the factory.

In the load-center system, because the low-voltage feeder runs are short, there is a tremendous saving in copper and some saving in steel (cable sheaths) and the investment in secondary cable is materially decreased. There is also a saving in substation cost. In a medium sized factory, for example, with a power demand of 3000 kva. using its power at 480 volts supplied from two 13,200-volt incoming lines, it has been estimated that, compared with the conventional low-voltage radial distribution system, 11,500 lb. of copper, 7800 lb. of steel and 1300 lb. of other mate-

rials can be saved by substituting the load-center power distribution system. The relative costs for identical factor load would be \$44,500 as against \$56,500 for conventional equipment.

The materials required for both systems above were calculated using varnished-cambric interlocked armor cable. This reduces by about 2½ times the amount of material required for either system if the conventional method of wire and conduit were used. In the interlocked-armor cable the copper conductors are each insulated with varnished cambric, stranded together with treated jute fillers and bound with a rubber-filled tape. The flexible, interlocked armor is of galvanized steel.

Another factor favoring the system is that because of the shorter secondary runs, voltage variations and flicker are less than with the old system. Installation time is shorter since these units are completely built and wired in the factory. Another time saver is the simplicity with which the equipment can be ordered since a detailed specification of every part is not required.

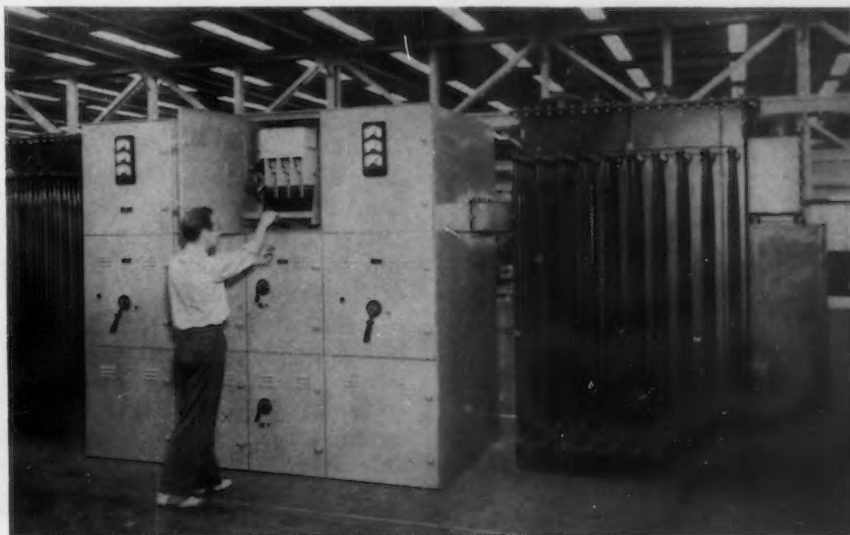
The General Electric unit substation is a compact assembly of a high-voltage switchgear section, step-down transformer section and

low-voltage switchgear section. The primary switchgear sections may be supplied for one or more incoming lines in ratings up to 15,000 volts and 2000 kva. or higher.

The step-down transformer sections are three-phase units either of the non-inflammable insulating liquid or air-cooled type. Primary and secondary leads are arranged for convenient throat connection direct to the switchgear sections. These unit substations step down the incoming power of from 2300 to 13,800 volts to the utilization voltage, which may be 120/208, 220, 440, or 550 volts. Secondary switchgear for the low-voltage distribution circuits is of the metal-enclosed drawout type (see photo) with easily removable air circuit breakers designed for circuits of 600 volts or less.

A major advantage of the load-center system is its flexibility whereby it can be tailored to fit almost any application through the use of any one or combination of four basic circuit arrangements, the selection of which must be considered in the light of the particular requirements of the individual plant as regards first cost, safety both to personnel and equipment, operating simplicity, maintenance, voltage regulation, power losses, and flexibility.

LOAD-CENTER unit substation installed in an ordnance plant. The easily removable draw-out secondary air circuit breakers are shown. Primary power is brought in at high voltage through new armored conductor cables.



New Equipment . . .

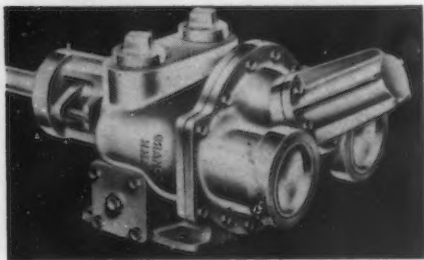
Plant Service Equipment

New and handy items coming into the field of plant service are described in the following. Also, items that add to worker's safety, comfort, and efficiency are included.

A NEW series of corrosion resisting pumps in which it is possible to get 480 combinations of alloys, types and sizes with heads and capacities to meet a variety of requirements was recently introduced by the *Duriron Co., Inc.*, Dayton, Ohio. They have a convertible feature in that they can be converted to stainless steel pumps from pumps made of high-silicon irons, Duriron and Durichlor by simply substituting wet-end parts. This feature is valuable where there is likely to be a change in the liquids handled. Other features include the interchangeability of newly designed open and closed impellers with negative pressure on the stuffing box; oversize ball bearings throughout, and micro-adjustment of the impeller.

Industrial Pump

DESIGNED originally for high-speed fueling of airplanes, the new Granco model HHF transport pump, made by *Granberg Equipment, Inc.*, Oakland, Calif., can be applied in moving paints, solvents, oils and other industrial materials. The pump has high capacity at low speed, rated from 50 gal. per min. at 100 r.p.m., to 200 gal. per min. at 400 r.p.m. The relief valve is submerged, chatter proof, and adjustable from the out-



side of the pump, and there are no valves, gears, cams, etc., the pumping action being brought about by the natural squeezing motion of the knuckle-joint rotor. The two 3-in. suction ports are placed horizontally and the two 2½-in. discharge ports are placed vertically. Either pair may be used, depending upon the direction of rotation of the pump.

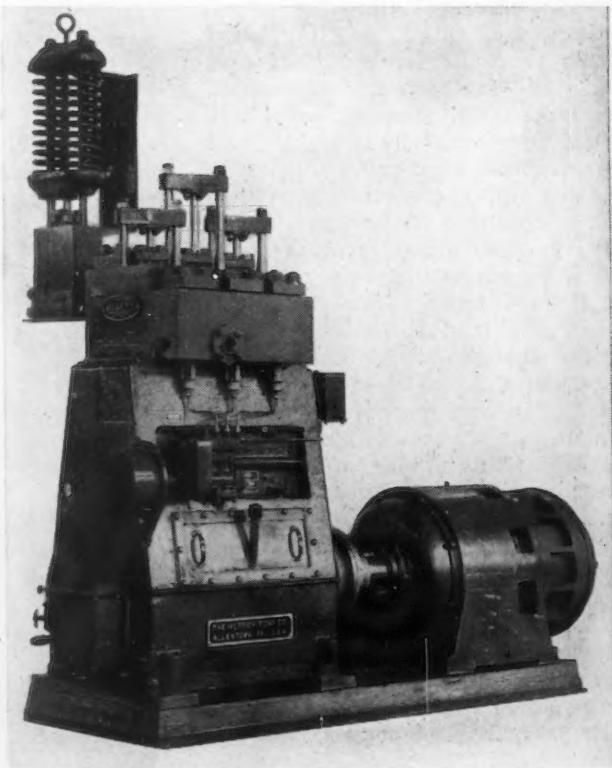
Vertical Power Pump

A NEW, high pressure, vertical triplex power pump, manufactured by *Worthington Pump and Machinery Corp.*, Harrison, N. J., is supplied in eight sizes, for pressures up to 9800 lb. per sq. in., and in capacities up to 51 gal. per min. The pump is particularly suited to applications where small capacities and high pressures are required, as for operating hydraulic presses, in plastic manufacture, roll balancing in steel mills, etc. The pump has no gears and is designed for use with built-in gear head motors, but it can be arranged for V-belt drive. Plungers are outboard and there is a dry joint between the liquid cylinder and the power frame to prevent leakage of the liquid from being pumped into

the crankcase and contaminating the lubricating oil.

High Pressure Power Pump

A NEW line of high pressure, vertical triplex, constant-stroke pumps has been developed by the *Aldrich Pump Co.*, Allentown, Pa., in sizes ranging from 10 to 150 hp., for pressures up to 9800 lb. per sq. in., and capacities up to 220 gal. per min. Design of these pumps make them adaptable to gear-head motor or speed reducer drive, and provision has been made in the larger sizes for using built-in gearing or belt drive direct to the crankshaft. Patented synchronized suction valve control

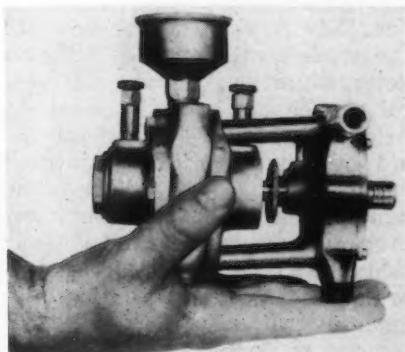


NEW EQUIPMENT

can be adapted to the pumps, for services such as central hydraulic accumulator systems where several presses are in constant operation. Outboard plungers are dust sealed and weather tight with a removable cover.

Air Powered Pump

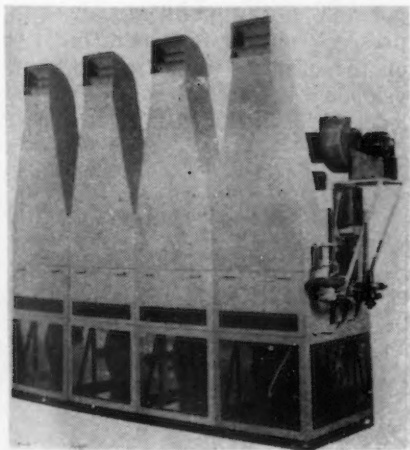
THE EASTERN ENGINEERING CO., New Haven, Conn., announced a model D air powered pump for industrial, pilot plant, laboratory and experimental use where an explosion proof unit is



required and compressed air is available. The air powered motor permits variable performance and makes the pump positively explosion proof. Capacities from $7\frac{1}{2}$ to 15 gal. per min. with pressures from 13 to 34 lb. per sq. in., can be obtained with these units. The pumps are made of various materials, depending on their use.

Unit Heater

SURFACE COMBUSTION CORP., Toledo, has developed a heavy duty unit heater, known as the BBC-24 Janitrol series, for heating large buildings such as airplane hangars, factory buildings, steel mills, warehouses, etc. The unit is built up of a series of gas-



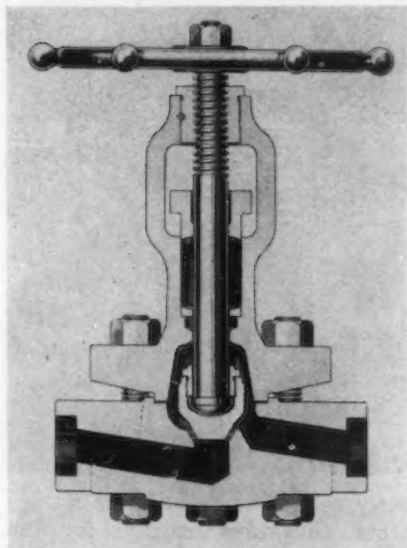
fired sections, each with a rated input of 250,000 B.t.u. per hr., with all blowers mounted on a common shaft and driven by one motor.

Fan Blade

A NEWLY designed fan blade, constructed for quiet operation, has been announced by the **Chelsea Fan & Blower Co.**, Irvington, N. J. The polished steel, die stamped and formed blades are riveted to the bolted arms, and a polished, streamlined hub is mounted over the fastening base. The blades are available in sizes ranging from 19 to 72 in.

Valves

INTEX globe stop valves, made by **Edward Valve & Mfg. Co., Inc.**, East Chicago, Ind., are designed for leak-proof performance in extreme temperature and pressure service. With an integral seat



formed of a heavy stellite ring, leakage between the seat and valve body is eliminated. Built in conformance with A.S.M.E. boiler Code and A.S.A. standards, these valves can handle pressures up to 1500 lb. at 950 deg. F., and are available in $\frac{1}{2}$ to 2 in. sizes.

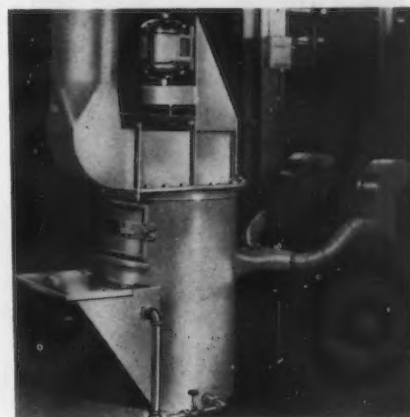
Plastic Fan Blade

A PLASTIC fan blade, light in weight, non-resonant and non-corrosive, has been developed by the **Torrington Mfg. Co.**, Torrington, Conn., to replace the use of aluminum for this article. Sizes available are limited to 10, 12, 14

and 16 in., in the standard four-blade series. Tests indicate that these blades are sufficiently durable for practically any normal application, and their performance is nearly identical to that of steel and aluminum blades.

Wet Dust Collector

A NEW water-type dust collector has been introduced by the **Newcomb-David Co.**, 5741 Russell St., Detroit, and is designed to re-



move dirt, dust, lint, grindings, fumes, and vapors from the air, and to ventilate explosive ducts and hazardous operations, such as finishing magnesium alloys. The unit requires only one motor and uses a pool of water rather than continuous flow, adding to operating economy. Dirt is collected in a sludge tank, easily removed for cleaning.

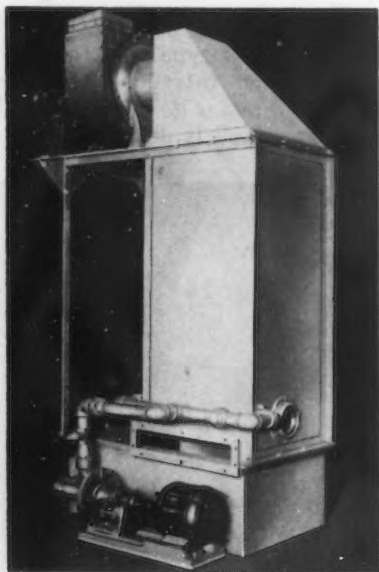
Cyclone Dust Collector

THE TORIT MFG. CO., St. Paul, Minn., recently designed a cyclone-type dust separator for collecting dust from grinding and polishing wheels, available for use with or without filter bag collectors. The separator catches 75 to 95 per cent of the dust in a bottom chamber, the remainder being exhausted through a center pipe on which a filter fits.



Magnesium Dust Collector

THE new Hydro-Whirl dust collector, developed by the *Industrial Sheet Metal Works*, Detroit, for use in plants handling magnesium alloys, collects buffing, pol-



ishing, and grinding dusts in the Hydro-Whirl and forces them into a tank. The unit consists of a rotating shaft on which are centered a series of disks. The controlled rotating speed of the shaft throws a rain of water into the baffled section of the unit where the dust is whirled out of the air stream. The units are also applicable in plants handling other metals, as well as magnesium.

Centralized Lubrication

A CENTRALIZED lubricating system, developed by *Lincoln Engineering Co.*, St. Louis, is easily installed for lubricating all bearings. The system consists of a number of injectors, one for each bearing to be lubricated, and each connected to the bearing by tubing and adjusted to discharge the re-



quired amount of lubricant. The injectors can be mounted singly or in manifold and are supplied from a central pumping unit. Pumping units ranging from 2 to 400 lb. are available and the system can be electrically operated with push button control or automatic with time clock control.

Wrench Truck

ELWELL - PARKER ELECTRIC CO., Cleveland, introduced a gas-electric type truck for "trapping" loaded hopper cars. The truck is lined up with the squared shaft on the side of the car, and a wrench turns the shaft. A single truck can open and close 515 cars per day, and eliminates the possibility of injury to workmen in turning the shafts by hand. Speed in unloading the car, facilitating



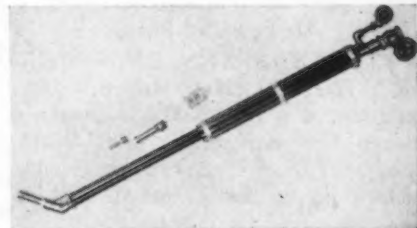
early release to the carrier, is another advantage claimed for the truck.

Cooling System

A NEW line of liquid cooling systems for air conditioning and industrial process requirements has been developed by the *Worthington Pump and Machinery Corp.*, Harrison, N. J. A centrifugal compressor, of volute design, is used, as opposed to the diffuser design heretofore used in the centrifugal refrigeration field. Other features of this system are dual lubrication, and balancing of end and side thrust by arrangement of impellers and volutes. The system has found widespread application in controlled temperature plants.

Steam Gun

A STEAM gun designed for quickly removing dirt, oil, grease, grime, and similar deposits from machinery and equipment has been developed by *Oakite Products,*



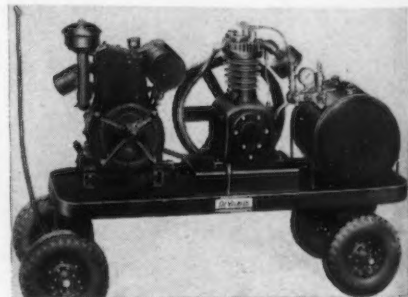
Inc., New York. The gun provides the triple combination of effective detergent action, heat and mechanical force, and can be used at heights up to 12 ft. without the aid of pumps, injectors, motors, etc. A steam supply of 30 lb. or more pressure, a solution container, proper lengths of steam and solution hoses, and the cleaning gun are all that is needed. The gun is made in two sizes, the smaller being 3½ ft. long weighing 1½ lb., and the larger being 7½ ft. long weighing 14½ lb.

Door Operator

A NEW type Air-Lec door operator for sliding doors was recently introduced by *Schoelkopf Mfg. Co.*, Madison, Wis., operated by compressed air. During the main part of the travel, the door rolls freely by its own momentum at a controllable pre-determined speed. The main spring, regulated by the checking mechanism of the air cylinder, completes the last phase of opening or closing the door, resulting in a quick start and a smooth stop.

Compressors

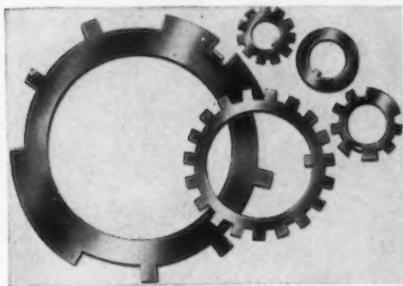
TWO improved series of 4 and 6-hp. gasoline engine driven portable spray painting air compressing outfits for operating two or three spray guns has been developed by the *DeVilbiss Co.*, Toledo, Ohio. Included in these series



are 20 assemblies, which are skid mounted, rubber tired, steel wheeled trucks or two wheeled trailer outfits. The 6-hp. units may be had with or without electric starters, and air or water-cooled engines are optional. They have twin disk clutches, permitting starting of the engine independently of the compressor.

Custom Lock Washers

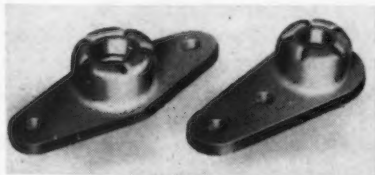
CUSTOM made lock washers and thrust washers in various sheet alloys are made by the *Dayton Rogers Mfg. Co.*, Minneapolis.



By a special die stamping process, 100 special washers can be made at a cost comparative to that of six or eight hand made washers. Present sizes range from 1/2 to 12 in. in diameter of any sheet alloy that can be die stamped.

Stop Nuts

ELASTIC STOP NUT CORP., Union, N. J., offers a new anchor type stop nut for blind mounting applications. Designed to provide vibration-proof fastenings for removable plates, the nuts are



permanently riveted to the inside of a structure. Bolts, inserted from the outside, pass through the removable plate into the nuts. The nuts are offered in a wide range of sizes, materials, and thread systems, and are all self-locking.

Solder Kits

A NEW product, Jiggers, made by *Jiggers, Inc.*, 215 West Illinois Street, Chicago, is a small, self-contained soldering unit that contains the correct amount of 50-50 solder and flux hermetically sealed within a waterproof, heat-generating outer shell. A wire



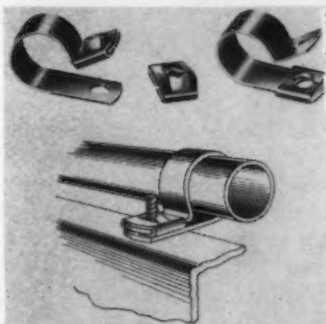
splice is merely pushed into the Jigger, and a lighted match applied. The Jigger shell ignites, melting the solder into the splice. The burned shell drops off and a smooth, soldered splice results.

Drum Level Indicator

THE U-C Level Indicator Sales Division of Marketing, Inc., Milwaukee, developed a liquid level indicator consisting of a cork float mounted on wire rods and connected to a gage that is installed on the external fitting of a tank. The fitting is designed to receive a tap, and the indicator fits all standard 55-gal. steel drums. The gage gives an instant indication of the amount of liquid in the drum, and is said to work with all liquids.

Conduit Clamp

NEW conduit clamps with self-retaining speed nuts attached have been announced by *Timmerman Products Inc.*, Cleveland. The clamps are standard AC-755 except that the speed nuts are attached to



either the upper or lower leg of the clamp for faster assembly, reducing the material handling in assembling. Assemblies are made quickly, and will not loosen because of vibration.

Safety Scaffold

THE Fieroh safety elevator, scaffold and ladder truck, made by *R. W. Fieroh Co., Inc.*, Chicago, increases the efficiency and production of construction and maintenance men. Workers are always kept in a correct standing position on a platform to work freely and fast, and are protected from falling by a guard rail. The eleva-

tor feature operates the platform which hangs from two hooks from any ladder rung, but detaches and can be hooked to a leather shoulder strap of the workman as he changes position. The scaffold will elevate to 14 ft. 7 in., and the entire unit is mounted on four rubber tired casters, the rear of which lock; the front ones are relieved by rubber padded jacks.

Photo Identification

EMployee identification by photographic badges or passes is simplified by equipment made by *Photographic Equipment, Inc.*, 210



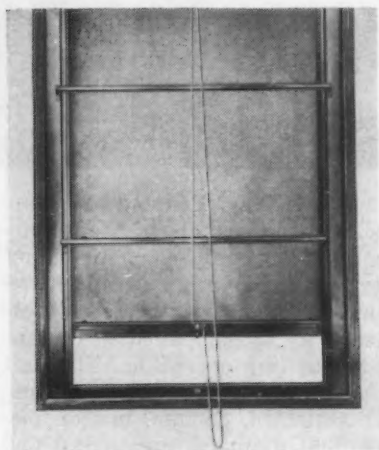
East Park Way, Pittsburgh. Identification passes show the photograph of the employee, his name, height, number, signature, department, and any other desired information, all accomplished in the one photographing operation. The unit is portable, easy to operate, and uses standard, 35 mm. motion picture film. Camera, measuring and numbering devices, lights, and wiring are all attached to the Ident-O-Graph unit, and can be used at any time.

Blackout Coatings

DUE to demands for precautions against air raids, several manufacturers have announced paints and coatings for blacking out windows and skylights of plants, homes, apartments, and other buildings. *The Carbozite Corp.*, Pittsburgh, makes a blackout coating that is completely opaque and produces a matte finish. *Thompson & Co.*, Oakmont, Pa., developed a quick-drying, black paint, completely opaque, and possessing pronounced weather resisting qualities. *American-Mari-*

etta Co., Chicago, markets a paint in paste form that, when cut 50 per cent with water, can be brushed or sprayed on windows, giving 800 sq. ft. of coverage per gal. and drying in 40 min. *Sherwin-Williams Co.*, Cleveland, announced a blackout paint that can be applied to either side of the glass and is non-reflective. This paint may be brushed or reduced one-third with petroleum thinners and sprayed. The *Midland Paint and Varnish Co.*, Cleveland, makes a P-40 blackout paint for outside application that dries rapidly to a self-leveling, dull, flat surface, and gives coverage of about 550 sq. ft. per gal. This paint is said to be unaffected by sun rays, summer heat, rain, sleet, or high heat from the inside of building, and can be removed by wiping off with an inexpensive solvent.

Midland Glue Product Co., Detroit, makes a No. 222 blackout glue that permits window panes to be coated with a waterproof paper, cardboard, fiber, or other such material to prevent shattering after painting. *Higgin Products, Inc.*,



Newport, Ky., manufactures a blackout window shade, light proof and custom built for specified window and door sizes. The unit fits in metal slides, is reinforced with cross metal ties to prevent wind pressure from forcing the cloth out of the guides. Material is a pebble-grain cloth, two fabric layers thick and coated on both sides.

Sanitary Unit

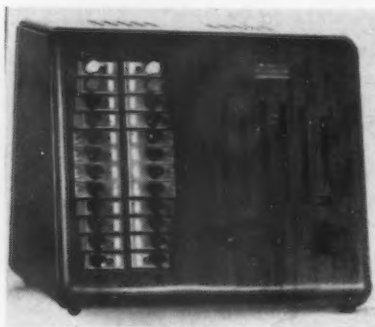
DEFENSE plants, confronted with plant and personnel expansion, find assistance in providing sanitary facilities in the new, multiple toilet combination, called the Kelly-Octopus, recently developed by the *Milwaukee Stamping Co.*, Milwaukee, Wis. Eight com-

partments arranged in a circle around a single drain pipe require a minimum of floor space and save considerable sheet steel over standard types of units.



Industrial Communication

A NEW, low-cost intercommunication system for industrial plants has been developed by *Allied Radio Corp.*, Chicago, known as the Knight Super-Selective system. It has $2\frac{1}{4}$ watt power output, enabling 10 sub-stations to carry five simultaneous two-way conversations. Up to 2000 ft. of cable may be used between each station, and the system operates on 110 to 115 volt a.c. or d.c.



ANOTHER communication system for selectively contacting up to 20 sub-stations, or paging all stations simultaneously, was announced by *Executone, Inc.*, 415 Lexington Ave., New York. Super-powered and directional trumpet-type stations are available for noisy locations or long-range sound coverage. Special red buttons facilitate paging of individuals in any part of the building.

Tool Cabinets

LYON METAL PRODUCTS, INC., Aurora, Ill., designed a tool cabinet with a heavy gage top that is especially handy as a bench-



cabinet for machinists. The top is ideal for small vises and grinders, and 12 sq. ft. of enclosed storage area are protected by full swinging, triple latch doors equipped with a padlock hasp or a built-in flat key lock.

Plastic Gloves

SURESEAL gloves, made by the *Surety Rubber Co.*, Carrollton, Ohio, are made of a plastic mate-



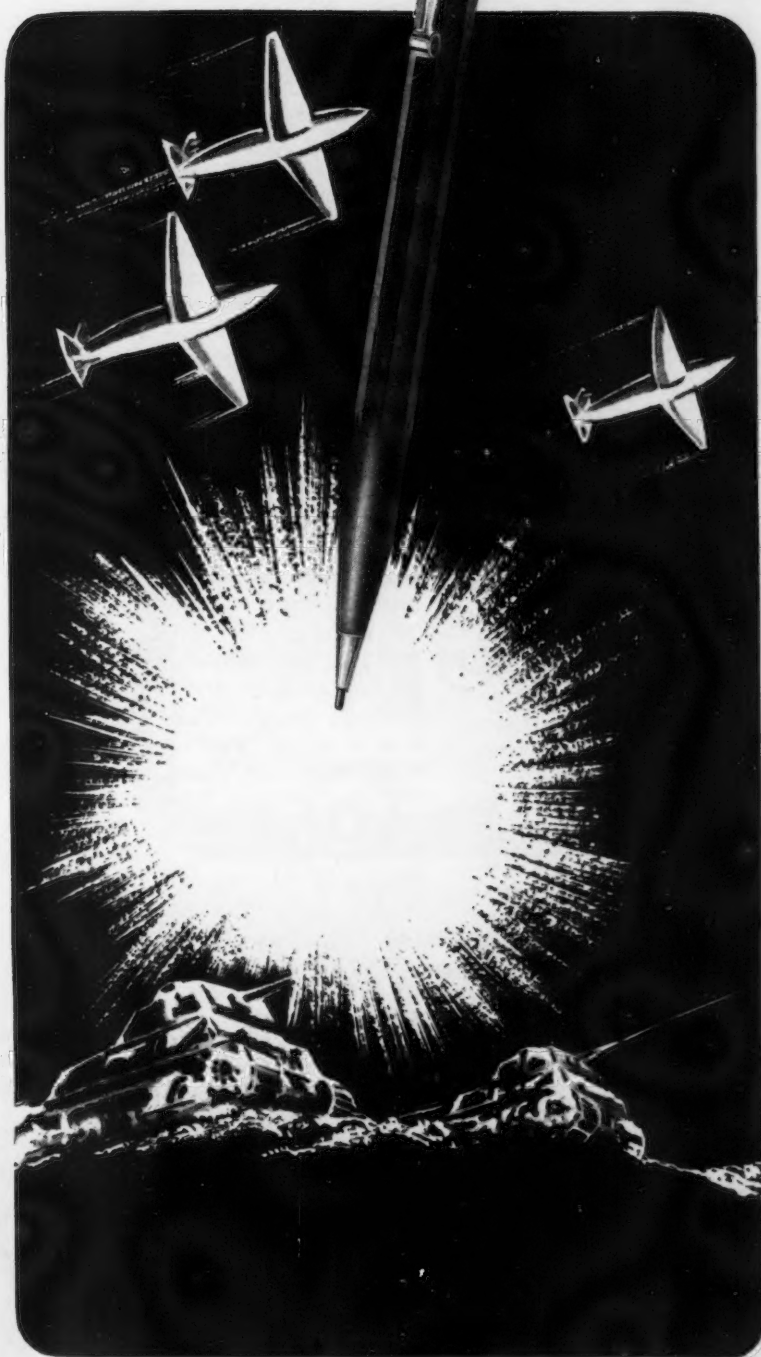
rial and resist caustics, acids, solvents, oils, etc. Complete flexibility and finger freedom insure against hand injuries. The gloves are also made with a fabric or leather finish, tightly bonded to the plastic base. Abrasion and tear resistance is good, and materials that usually attack rubber gloves are claimed to have no effect on Sureseal gloves.

Mobile Water Tank

A SANITARY water dispensing unit, made by the *Universal Paper Products Co.*, Chicago, eliminates the germ-exchange bucket-and-dipper method of dispensing water on construction jobs and in factories. The mobile tanks are made in two models, one being carried on a man's back, and the other worn at his side. Both are of lightweight metals and have standard faucets and a paper cup dispenser. They are available with a felt lined canvas jacket which serves as insulation and as a padding for the carrier's comfort.



A pencil manufacturer showed the experts new speed in shell production



*... after Scripto and
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An output of 13 to 15 million automatic pencils a year is real production for any plant. This is the volume the Scripto Manufacturing Company has been producing.

But making brass boosters for high explosive shells is a very different problem. At least, that's what the experts thought when Scripto went to work for Uncle Sam. But production genius has a way of getting results . . . and today the Scripto plant is turning out millions of boosters at a high production rate.

If this were an isolated instance, or just luck, it couldn't mean much to you. But behind it is a story of skillful planning, in which a Revere Technical Advisor was able to supply the needed answers about brass. New tools were made, new machinery built, new gages designed, and new methods were worked out.

The first booster told the story. The set-up was right, and the brass from Revere was right . . . boosters started pouring out with almost the volume of the former "Scripto" pencils.

This is an example of the way Revere Technical Advisors have been able to help scores of Revere customers, old and new. If you are up against some problems in changing over, why not call Revere? It's the surest way to be sure in working with copper alloys and brass.

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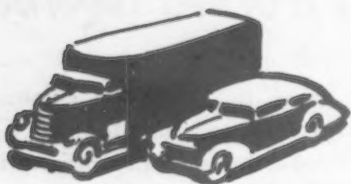
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THE IRON AGE, February 5, 1942—69

Assembly Line . . .

•Kanzler, new auto czar, seeks to determine how much war work small companies can take . . . Advocates allocating "hard" stuff, requiring big engineering program to large plants, "light" stuff to others . . . Vaniman appointed deputy chief.



DETROIT—After hardly more than a week as automotive chieftain of the War Production Board, Ernest Kanzler has developed a picture of the auto industry's war work efforts that has both depth and good perspective. In a few words he summed it up last week realistically.

"One of the first things we have got to do in this job," Kanzler said, "is to look at the industry as a whole and see exactly how much they are filled up now with orders."

"One thing is apparent, the major companies already have so many orders that they are completely snowed under in tooling up. We know very well that their own tool rooms are full, that they have placed orders for tools and are placing others daily wherever they can just as soon as their tool designers can get out the prints. Until these tools are available, (and by tools we mean jigs, fixtures, dies and cutting tools) there are going to be some idle machines standing around because these machines just can't be used for making the war materials until so equipped."

"What we are trying to find out right away, now, is how full of war work are the smaller concerns. Any concerns that have some open capacity for war work are to be given an opportunity at once to take on

more orders, so they also can get tooled up and get their machines to work."

SOME of the large companies are so loaded up with war orders that they will have to get outside help, Kanzler stated. Such concerns, he pointed out, relieve the load by buying in the way that they have always bought—from their list of suppliers. That, he added, is the normal way of the industry to function, even though buying from suppliers is now labeled "sub-contracting."

If the new auto czar is to be judged at all on the basis of his first week here, it can be said that he has shown that he does understand the automobile industry. He is, in fact, doing a better job of explaining its activities to the public than the industry itself has done in many instances.

Turning to contract figures to show the size of the job that the industry has undertaken, he points out that on the fateful day of Dec. 7 the industry had a load of \$4,500,000,000 in contracts previously placed (unfilled orders). This was just about equivalent to one year's production of automobiles and trucks at a better-than-average pace. Then a dam burst, and between Jan. 5 and Jan. 17 the automobile industry was loaded up with another \$3,500,000,000 worth of military supplies and equipment (as announced by Under-Secretary of War Patterson). Since that time, it is understood, the rate of orders piled on the industry each day has been at the same high level. Therefore, at the end of January the industry had a loading assumed to amount to about \$11,000,000,000 or \$12,000,000,000.

SPEAKING broadly, it is being assumed by WPB that the auto industry will have a production rate somewhat in excess of "eleven, twelve or thirteen billion dollars a year," at least. This is about two or two-and-a-half times the industry's normal rate of output.

As an aside, it might be pointed out that no one has ever yet succeeded in measuring the industry's true capacity during peace-time, so it is hopeless to try to estimate the true capacity of the industry

during wartime. Mr. Kanzler wouldn't commit himself on that point and it is easy to understand why. It might be that, machines, labor and materials being available, this industry could be pushed up to three or four times its previous peak output—maybe up to 15 billion or 20 billion dollars a year. All anyone knows now is that it is on its way.

Kanzler has broken down the job to be done into two classifications. Some of it he calls the "hard stuff" which can be given only to firms with large engineering forces and tool designers. The rest of the war work he calls "light stuff"—like cartridges and small shells, fuses and a whole list of other things which do not require a mammoth planning and engineering program. Rightly, he points out that it would be wrong to load up the big plants with the light stuff, using their space, men and executive talent and thereby blocking progress on the hard jobs. He explained that by "hard stuff" he meant tanks, guns, gun directors, airplanes, airplane engines, diesel engines, etc.

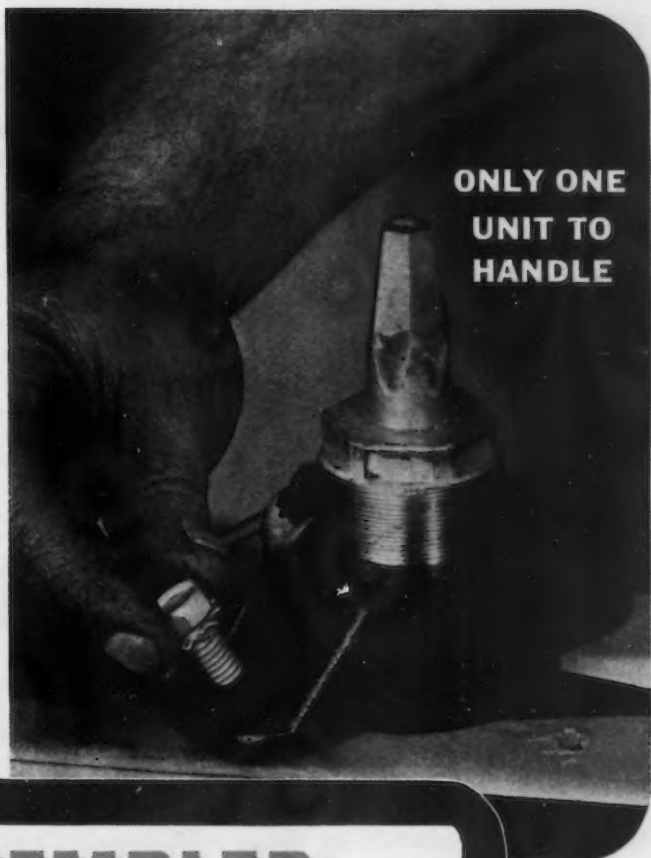
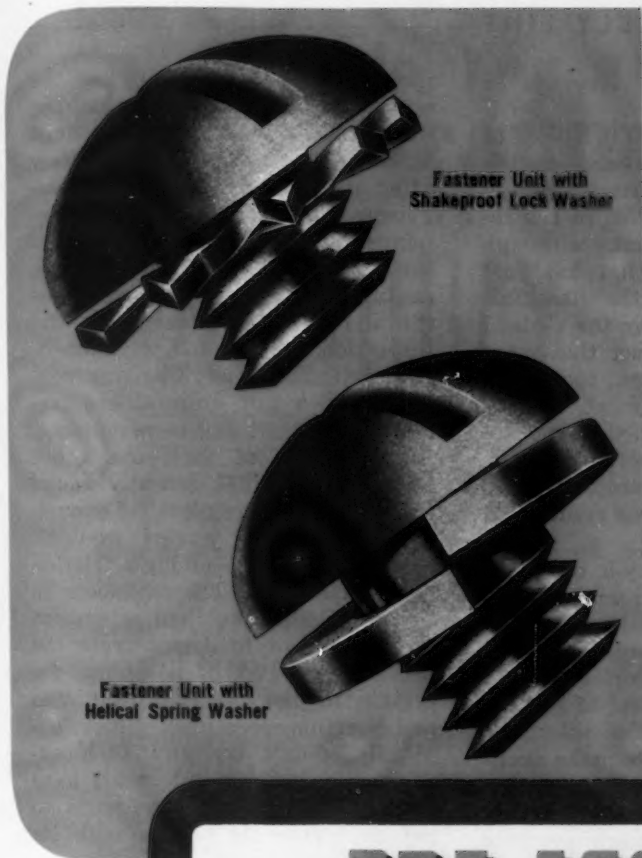
THE war work on which the automotive division will concentrate its attention will consist, first of all, of "anything sold to the Army and Navy" and, in addition, anything with an A-1-J priority, or better, according to Kanzler.

Peak employment, he said, will develop in this industry during November and December, 1942, and January, 1943. He estimated that employment totals would reach a level one-and-a-half or two times greater than in peacetime, and that upwards of 650,000 workers would be required in Detroit compared with the June, 1941, peak of 432,000. This, he said, means the employment of a lot of women workers in the industry, and the training of many more foremen and supervisors.

"Here is where labor can make one of its greatest contributions, in anticipating the need and helping in the training program," he declared.

Besides expecting the industry to be in full swing next year, he also anticipates a rapid acceleration on war production this spring.

"You're not going to recognize



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LICENSOR: ILLINOIS TOOL WORKS CHICAGO

this country four months from now," he said.

Kanzler is still recruiting his technical staff. He has selected a deputy chief who will serve as liaison between WPB offices in Washington and the Detroit headquarters. The deputy chief is R. Lawrence Vaniman, on leave from Chrysler Corp. where he has been executive manager of the African division. Vaniman, with Chrysler for 12 years, was previously engaged in various building and contracting activities in Detroit, was president of the Produce Terminal Corp., in Chicago, and was chief engineer of the Union Stockyards and Transit Co. He is an engineering graduate of the University of Illinois (1912). The rest of the staff is being assembled now. On its qualifications, plus the organization that Kanzler is able to incorporate, its ultimate success will depend. Kanzler, by the way, does have a reputation of being an A-1-A organizer.

Permanent headquarters of the automotive chief and his staff will be on the eighth floor of the Boulevard Bldg., Detroit, along with the Contract Distribution Service and the Priorities Division, which are already established there.

The pooling of information about machinery in the industry is moving ahead on two fronts simultaneously. Kanzler has initiated one survey to check up on the availability of 25 critical types of machines. In addition, the Automotive Council for War Production has instituted a listing service (discussed last week) to check up on all the machinery available in the automotive industry.

Kanzler's list will attempt to determine what machines of these 25 critical types are available, whether they are in tool rooms or in production, when they will be free for other war work, if they are already occupied. "We hope to take these machines and put them on war work," Kanzler said.

THE transfer of machines will be mostly on the basis of selling equipment from the present owner to someone who can use it for more important work, Kanzler believes. The lending of machines, or leasing, he said, raises endless problems, especially in regard to the condition of machines at the time of delivery and again at the

time when they are returned to original owners.

The industry's ACWP listing of machines is going forward and the listing service is already receiving demands from firms in the industry for equipment, although classification of the list has just begun. The size of the classification job undertaken by the Council is indicated by the fact that more than 150,000 machine tools and pieces of plant equipment, belonging to as many as 1500 firms, are expected to be listed before the survey is complete, according to George Romney, managing director of the Council.

"Fortunately, the job does not have to be started from scratch," Romney said, "since several of the larger companies have virtually completed total inventories of their own equipment. Typical of the all-out cooperation is the voluntary offer of one company to make available to the Council a battery of punch card machines on a night-shift basis. These machines now are almost as hard to get as machine tools themselves, so that this particular aid will permit tabulation of the lists of available tools far earlier than otherwise possible.

"A number of companies have already submitted lists; others have had staffs at work on an overtime basis since the Council's program was announced, and expect to report results within a week or two." Romney added, "it is too early to tell whether these specific demands (for unused equipment) will be met from inside other automotive plants, or the extent to which new machines still will be required."

THE Automotive Council has been asked by the armed services to provide copies of the list as soon as available. It is indicated that contractors in the industry will be required to try to meet tool requirements from the listing service before purchase of new tools will be sanctioned.

Another milestone has been passed in the war production program with the final acceptance of the first Buick-built airplane engine. This division has started in production just eight months after the breaking of ground for the plant. During the spring months it is expected to increase output toward the scheduled peak. Most

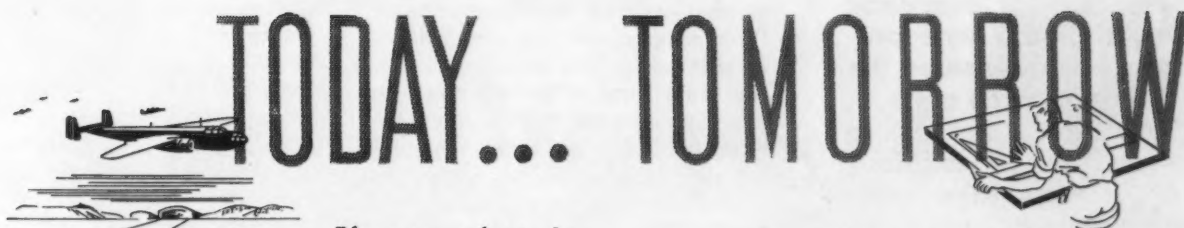
interesting sidelight on the acceptance test is the fact that the first Pratt & Whitney engine built by Buick was accepted immediately after its "green run." Buick engineers and production men are immensely proud of the feat and can well be. This means that the engine was able to complete the initial run and the tear down and inspection which follow immediately without undergoing any penalty run—a not unusual requirement in aircraft engine acceptance. As a matter of fact, one other builder of engines recently found that headaches are plentiful enough so that the first engine wouldn't run at all because of high friction in the assembly. The engineers in this particular case had attempted an experiment to demonstrate the necessity, or lack of necessity, for certain of the prescribed finishes and burring operations. Buick, obviously, didn't try any such experiments and certainly must have exercised a great deal of care to get such splendid results with its initial power plant.

IN the final official week of automobile and truck production, output totaled 73,305 compared with 79,930 in the previous week and 124,400 in the corresponding week of last year, according to Ward's Reports, Inc. This marks the official end of auto output except that a ten day waiver has been granted to those firms that could not fill their January quotas completely. Inability to fill the quotas arises in some cases from the fact that production was temporarily halted at the first of the year, plus the fact that the industry was then engaged in a change-over from bright work to no bright work. Many parts plants were closed down and, in some instances, parts were in shipment during this period, causing a mix-up of schedule. It is believed that within ten days the full quota can be completed by every firm, however.

Cleveland Plant Booked-Up

••• The Cleveland Hobbing Machine Co.'s plant, working on armament machinery, is entirely sold out for 1942, according to C. W. Blossom, president. Next month the company will move into its new plant, which will provide it with double the space of present facilities.

To Help You get the most out of STAINLESS STEEL



If your plant is using Stainless Steel for defense work—your big problems are to push the work out faster—to avoid fabricating troubles—and to keep costs in line. Ever since the earliest days of Stainless Steel we have been successfully attacking these problems. When Carpenter developed the first bright finish, ductile Stainless Strip and gave industry Free Machining Stainless Bars, the way was paved for the precision jobs men are turning out today. By cooperating on a wide variety of wartime jobs, Carpenter is adding to the fund of experience and information that is available to all Stainless users. Ask us for easy-to-understand fabricating information that will help you speed up production and overcome trouble. A letter to us, or a phone call to our representative, will promptly bring you the information you need.

Out of the vast proving ground of national defense will emerge better Stainless Steels and an improved "know how"—born of much problem solving. Thousands of products, like yours, will have "discovered" Stainless Steel for improvements in appearance and performance. But don't wait until tomorrow comes. Start thinking about tomorrow and redesigning for the future *now* . . . and let us cooperate with you. There is no let-up in Carpenter research. We'd like to think ahead with you—give you the benefit of our experience and new developments as they come along. Then when the zero hour on the sales front arrives, you'll be ready to uncover your new product, and get the jump on competition.



➔ To help make your fabricating problems easier, Carpenter offers this Stainless help. The handy Slide Selector Chart quickly suggests which Stainless analysis best meets your corrosion or heat resistance requirements. It provides answers to your questions about physical properties and fabricating conditions.

And to help you plan for tomorrow—this Design Booklet will show you practical ways to make the most out of the natural advantages of Stainless. It contains helpful hints on designing Stainless parts and products that are easier to fabricate at less cost.

A note on your business letterhead will bring you copies of either or both of these Carpenter helps. Or ask your nearby Carpenter representative for them. This offer good only in U.S.A.



THE CARPENTER STEEL COMPANY, READING, PA.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington . .

• Greater use of strip mill plates will expedite deliveries for everyone now that the war program has intensified the load upon wide mills . . . Government chooses to plead for redesigning rather than take arbitrary action.



WASHINGTON — The WPB Iron and Steel Branch is depending upon and confidently expecting voluntary cooperation from consuming industries in connection with its request that they use plates 72-in. and narrower from continuous strip mills. The purpose is to relieve the sheared plate mills, which, hard pressed by military requirements, are the bottleneck.

That the Branch wants to avoid arbitrary action was made clear at the press conference which its representatives held last week in explaining the plan to convert strips mills to plate production.

"You have allocation authority," a correspondent pointed out. "Can't you just allocate from your strip mills and tell your former sheared plate users, 'Listen, Joe, after such and such a date you can't get any more sheared plates. You will have to change your design.'"

"You can allocate, but I don't think you can change a man's order," replied J. V. Honeycutt, executive consultant to C. E. Adams, chief of the Branch.

"**I**N other words, it is the contractual obligations these fellows have incurred to users?" it was suggested.

"Let's go further than that," said Stanley Adams of the Branch staff. "We have the right to do

that; the powers are broad enough so that we can say to everybody, 'You have to use this size plate to do this job.' You would then have the same form of Government you have in Germany. You have got, roughly, 3000 to 5000 customers buying plates. We have 300 men in the Iron and Steel Branch. We would have to go over every bill of material and we would have to check them off and we would say, 'You can't use this; you have to change this.' Now it would take, I think, about 500 men to do this job and we would be doing it the hard way. We would have everybody . . . who buys steel against us, if we arbitrarily said 'This is what you have to do'."

Mr. Adams added that the Branch does not want to resort to compulsory allocation, satisfactory operation of which he questioned, but rather desires that the program be carried out on a voluntary basis.

STRIP mills have a much greater capacity for producing their regular product than for rolling plates. Output of the latter is limited by finishing facilities.

Hence the calculation that with conversion of strip mills, plate capacity will be increased from 6,000,000 to 11,000,000 tons is concededly only an estimate, but it is held to be conservative.

Explaining the necessity for using strip mills for plate production, Mr. Adams pointed out that there are eight companies and 13 sheared plate mills that can make plate over 90 in. wide and $\frac{3}{4}$ in. thick, and that it is only from these mills that such sizes can be secured. But, he said, the strip mills which have been supplying the automobile industry can change over and roll plates up to 90 in. wide.

Mr. Honeycutt said that the purpose of the Iron and Steel Branch is to have consumers place the largest possible percentage of their plate requirements on the strip mills. This may mean, he stated, "simply ordering, or redesigning, or regrouping sizes or using ingenuity to get them off of these over-crowded sheared plate mills on to the strip mills."

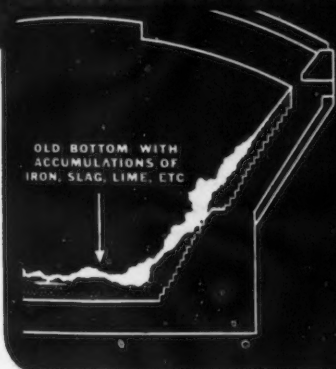
TO emphasize the seriousness of the problem, Mr. Adams said that as long as the plate sizes stand

NAM TALKS WAR-TIME CONVERSION: Meeting in New York at a conference of the directors of the National Association of Manufacturers, J. Howard Pew, Charles E. Wilson, and William P. Witherow discuss the conversion of their plants from peace-time to war-time production. The Sun interests, represented by Pew, are turning out merchant ships and tankers; General Electric, represented by Wilson, makes electrical equipment and turbines; and Witherow's Blaw-Knox Co. is making \$28,000,000 worth of steel, armor plate, and gun equipment for the armed forces.

AP Photo



SPEED PRODUCTION *with* BASIFRIT



Basic Refractories for the Steel Industry:

MAGNEFER—Dead-burned dolomite for hearth and slag line maintenance.

SYNDOLAC—Dead-burned dolomite, smaller in grain size than Magnefer.

BASIFRIT—Quick-setting magnesia refractory for new construction, resurfacing and general maintenance.

OHIO MAGNESITE—Domestic dead-burned high-magnesia grain refractory, equal to Austrian.

HEARTH PATCH—For deep hole patching and other quick repairs in the basic open hearth.

GUNMIX—A basic refractory with chemical bond, sized for use with a cement gun.

RAMIX—An air-setting basic refractory for rammed hearths and cold furnace repairs.

695 PLASTIC—Strong plastic with basic and neutral properties, for hot and cold repairs.



HIGH-GRADE PREPARED REFRACTORIES FOR THE CONSTRUCTION, MAINTENANCE AND REPAIR OF BASIC OPEN HEARTH AND BASIC ELECTRIC FURNACE HEARTHS

★ Keep your open hearths more steadily on the all-important job of making steel by using Basifrit for deep-hole repairs and for resurfacing.

This fast-setting, prepared magnesite can be installed in less than half the time required for the conventional magnesite-and-slag mixture; in addition, a Basifrit hearth stands up so well in severe service that it greatly reduces delay time for between-heat maintenance.

Proper installation is necessary for best results. Bottom holes should be rabbled clean of slag and metal and filled *quickly* with pure Basifrit, before slag and metal have time to flow back. No admixture of slag is normally needed. In fact, even in new hearth construction only 6% slag should be used with Basifrit.

Sixteen years of successful use by many operators prove the dependability of Basifrit. Now when every minute is more costly than ever before, you can *save time* with Basifrit, and *save it with safety*.

BASIC REFRACTORIES, INC.
FORMERLY BASIC DOLOMITE, INC. CLEVELAND, OHIO

as they do, the Navy, the Maritime Commission, the Army and the new war plants—the whole war effort—will suffer because they can't get the plates. If, for example, plates are given to aluminum plants, it was pointed out, it is at the expense of the Navy and if they are given to the Navy, it takes away plates that are needed for building plants for the production of synthetic rubber.

"We give it to those people and the railroads suffer," Mr. Adams continued.

Speaking of the matter of designing specifications, Mr. Honeycutt said that there are many now asking for plates 94 in. and 96 in. wide and $\frac{3}{8}$ in. thick who could just as well use two plates instead of one. A lot of these users, he said, will never get the wide plates as long as the war lasts.

Canada, Mr. Adams said, depends upon United States mills for its firebox steel and claims that if it does not get this steel, it might as well forget about its railroads. Though Canada's requirements for

firebox steel were said to be only 1200 tons a month, Mr. Adams referred to the situation as being very serious. In all the plate "that is mixed up in this steel," he declared, "there is no embryo A-10 or civilian economy or anything like that." This, he said, is one of the things that is going to win the war.

"EVERYBODY needs plate," continued Mr. Adams. "Now, you cannot get plate if you don't have a rating. There are thousands and thousands of people who should have plates. There are 11,000,000 tons of plates for the American people. Now take advantage of them. Do not try to keep in this little basket where there is only 2,500,000 tons. Here are the 11,000,000 tons. Come and get it."

So vital is the plate conversion program, in the opinion of the Iron and Steel Branch, that it has suggested that a "box" regarding the plan be carried in the trade journals.

Roosevelt Approved 225 \$1-a-Year Men

Washington

••• WPB Chairman Donald M. Nelson's testimony last week before the Senate Defense Investigating Committee had the remarkable effect of causing the committee to retract its smear charges made against dollar-a-year men in the government defense service, though the printed committee report carrying the loose, reckless charges cannot be recalled. To that important extent there still stands the committee's unsupported allegations that these men drawn from industry are "lobbyists in a very real sense." Further than this the report by strong implication accused dollar-a-year men of disloyalty to the government, concerned only with their own private interests.

Mr. Nelson, in a straightforward talk about dollar-a-year men, told the Committee, headed by Senator Truman of Missouri, that "one simply must have them in the places they are needed."

There are some 300 dollar-a-year men with WPB, Mr. Nelson said, and every one came to Washington at the request of the government and everyone was carefully investigated by the FBI or one of the other Federal investigation services. Of the 225 appointed up to Aug. 30, every one received the personal, signed approval of the President, Mr. Nelson explained.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Alloy Scrap Segregation At Source May be Mandatory

Washington

••• Segregation of alloy steel scrap at the machine, to permit more effective utilization of the alloy content of such material, may be made mandatory shortly, according to observers here. This step is expected to take the form of an "M" order issued by WPB, similar to the recent aluminum scrap segregation order.

Many plants are already segregating alloy scrap at the source, but it is felt that too much badly needed nickel and chromium is being lost through indiscriminate grouping of alloy scrap.

WPB Makes Three Seizures Of Materials and Equipment

Washington

••• Seized by order of WPB's Inventory and Requisitioning Section, the cargo of the German motorship Wilmeto, interned at Porto Rico, P. R., yielded, among other materials, 360 tons of brass and 50 tons of copper.

Another seizure authorized by the section was that of machinery, equipment and supplies of a TNT plant which had been closed. It has been restored to operation and is making high explosives for the Army and Navy.

Also 50 miles of 35-lb. rails, together with fastenings, totaling 3600 tons of scrap, have been taken over from a railroad company which was unable to make use of the material.

Imports of Critical Materials Up Sharply

Washington

••• In the last six months of 1941, imports of 10 critical commodities were larger than for each of the calendar years, 1938 and 1939, and almost as large as for the entire calendar year 1940, according to the Maritime Commission. The percentage increase in imports of some of these products for the calendar year 1941, compared to 1938, follows: bauxite, 195 per cent; chrome, 240 per cent; copper, 205 per cent; graphite, 693 per cent; manganese, 136 per cent; and tin, 279 per cent.

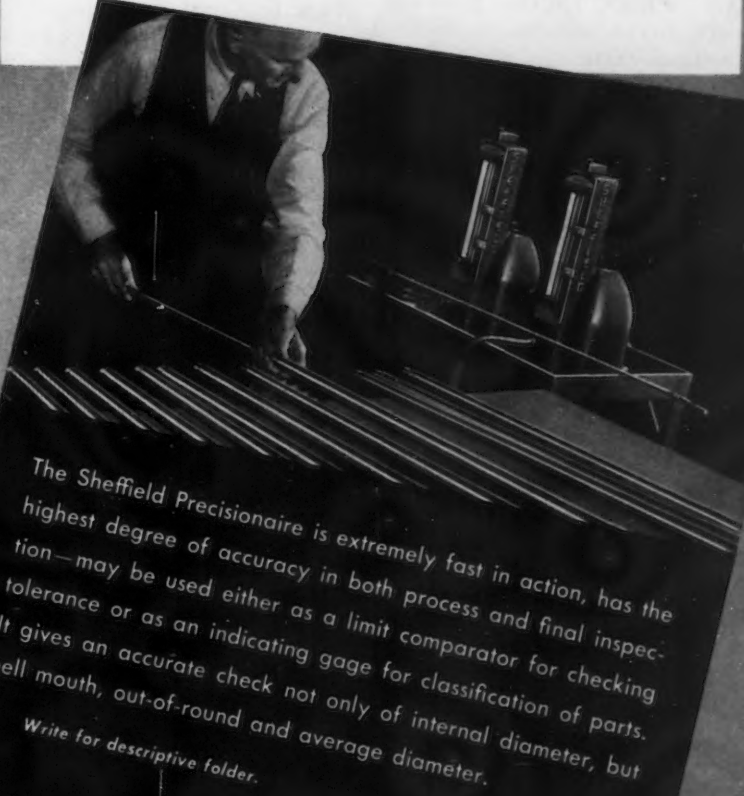
T. Spencer Shore Made Chief Of Advisory Committee Bureau

Washington

••• T. Spencer Shore, Akron, Ohio, has been appointed chief of WPB's Bureau of Industry Advisory Committees. He succeeds Sidney J. Weinberg, New York, who has become assistant to Donald M. Nelson, WPB chairman. Since Aug. 5, 1941, Mr. Shore has been assistant chief of the Bureau of Industry Advisory Committees. He came to OPM at that time from the General Tire and Rubber Co., Akron, of which he is vice-president and treasurer, on leave.

Use the PRECISIONAIRE to Gage Internal Diameters

Gun Barrels—All Calibers	Work Still on Boring Machine or Grinder
•	•
Gun Barrel Rifling	Carburetor Bodies and Valve Sleeves
•	•
Connecting Rod Bearings	Engine Cylinders and Liners
•	•
Piston Pin Holes	Parts Too Heavy to Be Brought to the Gage
•	•
Step Holes—Several Diameters	Bores Too Small to Be Checked Otherwise
•	•
Cam Shaft Bearings	Highly Finished Bores Vulnerable to Scratching
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Deep Blind Holes—to Within 1/16" of the Bottom	



The Sheffield Precisionaire is extremely fast in action, has the highest degree of accuracy in both process and final inspection—may be used either as a limit comparator for checking tolerance or as an indicating gage for classification of parts. It gives an accurate check not only of internal diameter, but bell mouth, out-of-round and average diameter.

Write for descriptive folder.

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Formerly—The Sheffield Gage Corp.
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SHEFFIELD
MASTER GAGEMAKERS

WEST COAST . . .

• Efforts of Midwest towns to "seize" Pacific plane plants because of war dangers without result so far . . . Subcontractors one reason why aircraft industry gathered on West Coast . . . Six new war plants to use Columbia river power.



SAN FRANCISCO — Midwest-ern towns anxious to become defense centers, which have been popping away at Pacific Coast war industries, so far have not been able to flush even a covey of aircraft plants.

Long before the war started, requests of the War or Navy Departments that certain industrial operations be located elsewhere were graciously accepted on the Coast and the same attitude seems to be universal now. For instance, members of the steel industry who attended the Nov. 11 meeting of the industry with the OPM will recall the statement that certain steel capacity originally planned for Los Angeles had been transferred elsewhere at the request of the War Department.

Great concern is now evident on the Coast that the present aircraft plants located here will be evacuated or that further expansion will be prohibited. Threat of such action apparently became so serious recently that a few parts contracts were cancelled, but they have since been reinstated.

It is no secret that more or less complete evacuation plans for the aircraft industry have been in existence for three years. But despite these evacuation plans, major expansion of the industry has been allowed. Unification of assembly operation in the interest of

efficient production has evidently been a major consideration, and no doubt will continue to be. Permission for some of the more recent expansions has only been granted however, with the stipulation that a portion of the parts be bought east of the Rocky Mountains.

SCATTERING of airplane plants all over the country has been regarded as desirable not only in the interest of military security, but also with an eye on the inevitable time when military orders will be sharply curtailed and the economic shock of getting back to normal will be in proportion to present expansion.

Superficial reading of defense awards might give the impression that the Pacific Coast is top heavy in aircraft manufacturing awards, but in many cases actual manufacturing operation will take place in plants located in the Midwest and South but owned by firms with Pacific Coast headquarters.

The most serious defections from tidewater plant sites have been the \$22,000,000 aluminum rolling mill and \$5,600,000 forging plant originally considered by the Defense Plant Corp. for membership in the integrated aluminum colony at Los Angeles and another \$22,000,000 aluminum rolling mill planned for a Columbia River site adjacent to the Troutdale, Oregon, reduction plant. Present plans for these plants indicate that they will be combined, trimmed considerably in size, and relocated at Spokane. By no stretch of the imagination can Spokane be considered as other than part of the Pacific Coast; so aluminum will still pass through the complete string of operations from ore to airplane without leaving the Coast. Electric power required for the rolling mill and forging plant will be supplied from the Grand Coulee-Bonneville system, just as though the plants had been located at the Columbia River site, but the required transmission lines will be considerably less. This even suggests that national defense may not have been the only consideration in choosing this new site.

TALK of transplanting the aircraft industry east of the Mountains comes cheap, but as a practical matter, except in cases of direct emergency, resulting dis-

location in production at a time when planes are urgently needed would be so great as to far overshadow any theoretical safety to be gained by the move. The newer plants, and nearly all of them are very new, were engineered with the possibility of air raids in mind, and Douglas' new plant is even built to operate during blackouts. Unless the enemy actually threatens physical possession of this territory, it would not only be craven but poor business to withdraw after such preparation.

If this war is being planned with any thought of an eventual return to a normal economy, one of the chief factors to be considered in an industrial evacuation is dislocation of labor supply. It is all very well to talk of locating industry in the middle of Wyoming or New Mexico, Utah or Nevada, and it is quite possible that the necessary housing, industrial, and commercial buildings could be built from the grass roots. Such towns would prosper and add to the business and tax tills of such states as long as the war lasts. Comes a day when warplanes are no longer being built, however, we would have great dust bowls of humanity, just as we had agricultural dust bowls from earth cultivated to meet demands of the last war. It would be a dangerous design to impose a boom economy in places where no peacetime economy ever has existed or could exist because of geographical limitations.

ONE of the reasons the airplane builders gravitated to southern California in the first place was that because there was a large number of small potential subcontractors. Were the aircraft makers now to fold their tents, the natural benefits of being located near these machine shops would be dissipated. Though it might be possible for these shops to ship parts to assembly plants located elsewhere, the more probable result would be a large blighted area of unused tool capacity suitable for aircraft work at the same time the prime contractors were trying frantically to develop similar new capacity in the localities to which they had removed.

To a far greater degree than in the industrial east, where one plant location is likely to be about

Etna Swaging Machines

are ideal for defense production!



...HERE,

two No. 72 ETNAS are swaging
copper bands on 20 m.m. shells
at the rate of

900 PER HOUR



• The use of standard ETNA Swaging Machines for direct defense production is demonstrated by these two No. 72 ETNAS (one shown) employed by a prominent mid-western manufacturer for turning out 20 m.m. shells. The operation consists of swaging a narrow copper band around the shell . . . production is 900 per hour!

This clearly shows one of the many points of superiority embodied in swaging by ETNA. These units, helping to make shells now, can be used for normal work later! In

other words, an ETNA purchased now for defense, is a money-saving, money-making investment for future use.

If you taper or size tubing or round solids . . . if you have small tubing assemblies, you can save by swaging. Call in the ETNA man for recommendations on your requirements. ETNA Swaging Machines are available in $\frac{3}{8}$ " to 4" diameter capacities—1" to 18" die lengths. Larger sizes are built to order.

IF IT'S A QUESTION OF TAPERING, SIZING OR
REDUCING OF ROUND SOLIDS
OR TUBING

"Ask **ETNA** about Swaging"

**THE ETNA
MACHINE COMPANY**
TOLEDO . . . OHIO

as strategic from the standpoint of assembling raw materials and reaching markets as another, the vast distances of the far West make the questions of materials, assembly and nearness to market factors which may make or break a firm in normal times. Thus, choosing of plant sites entirely on the basis of military safety could well result in making them entirely valueless when peace returns; otherwise choosing a slightly unsafe site now may mean that a war plant can become a cog in more normal economy some day.

Thus, the forces plugging for plant removal inland may well have the effect of sowing seed on barren ground unless the sites chosen

for evacuation and the facilities available are carefully weighed.

It is a safe prediction that when the smoke clears away, unless the military situation changes greatly, that few plants will be moved from the Coast and that new plants able to take advantage of the region's resources will locate there.

SIX new war industries will use Columbia River power in the states of Oregon and Washington within the next few months, Bonneville Administrator Paul J. Raver announced last week, after making commitments to the Defense Plant Corp. and the War Industries Board to serve the new in-

dustries with a total of 190,000 kilowatts of power.

The new plants include the Kaiser Shipbuilding Co. at Vancouver, Wash., which will be supplied with 8,000 to 10,000 kilowatts; additional aluminum capacity to be served by 30,000 kilowatts; an electrochemical plant, 12,000 kilowatts; a phosphorus plant, 40,000 kilowatts; a second phosphorus plant, 25,000 kilowatts; a ferro-silicon plant, 25,000 to 30,000 kilowatts; and an electrometallurgical plant, 50,000 kilowatts.

With the exception of the Kaiser shipyard, the sites for the industries have not been definitely determined by the Defense Corp. Names of the companies which will operate these plants also were not announced, but the aluminum capacity probably refers to the Spokane rolling mill.

As this is written, new trouble is brewing among welders in the Northwest shipyards and at the Boeing plant. Action of Sidney Hillman in attempting to negotiate the welders' trouble by long distance, when it last broke out, and in giving the A. F. L. the green light to force the welders back into their stalls did no more than to heal the surface of a festering sore. Since this action, the A. F. L. has been attempting to collect dues from members of the independent welders' union under the terms of the coastwide shipbuilding labor contract and the Boeing contract which gives the A. F. L. a closed shop. Some welders have refused to pay dues to the A. F. L., and the employers, by terms of their contract, have been forced to discharge them. When this happened at the Tacoma shipyards of the Seattle-Tacoma Shipbuilding Corp. last Friday nearly the entire welders' crew, according to the independent union, refused to enter the yard unless the discharged craftsmen were reinstated. Attempts to force poor agreements on the grounds of patriotism, such as has been done in the welders' case, will only last as long as it takes those with a grievance to find out that such action, in itself, is not really patriotism at all. Some A. F. L. members now have attempted to impugn the press for "stirring up" this welders' strike, but the condition is far more basic than mere articles. The publicity is only smoke from a smouldering fire.

ONE MAN DEFENSE PLANT: Ames McCain of Seattle, at work in his own machine shop. Doing all work himself, McCain handles sub-contracts for the Boeing Airplane Co.

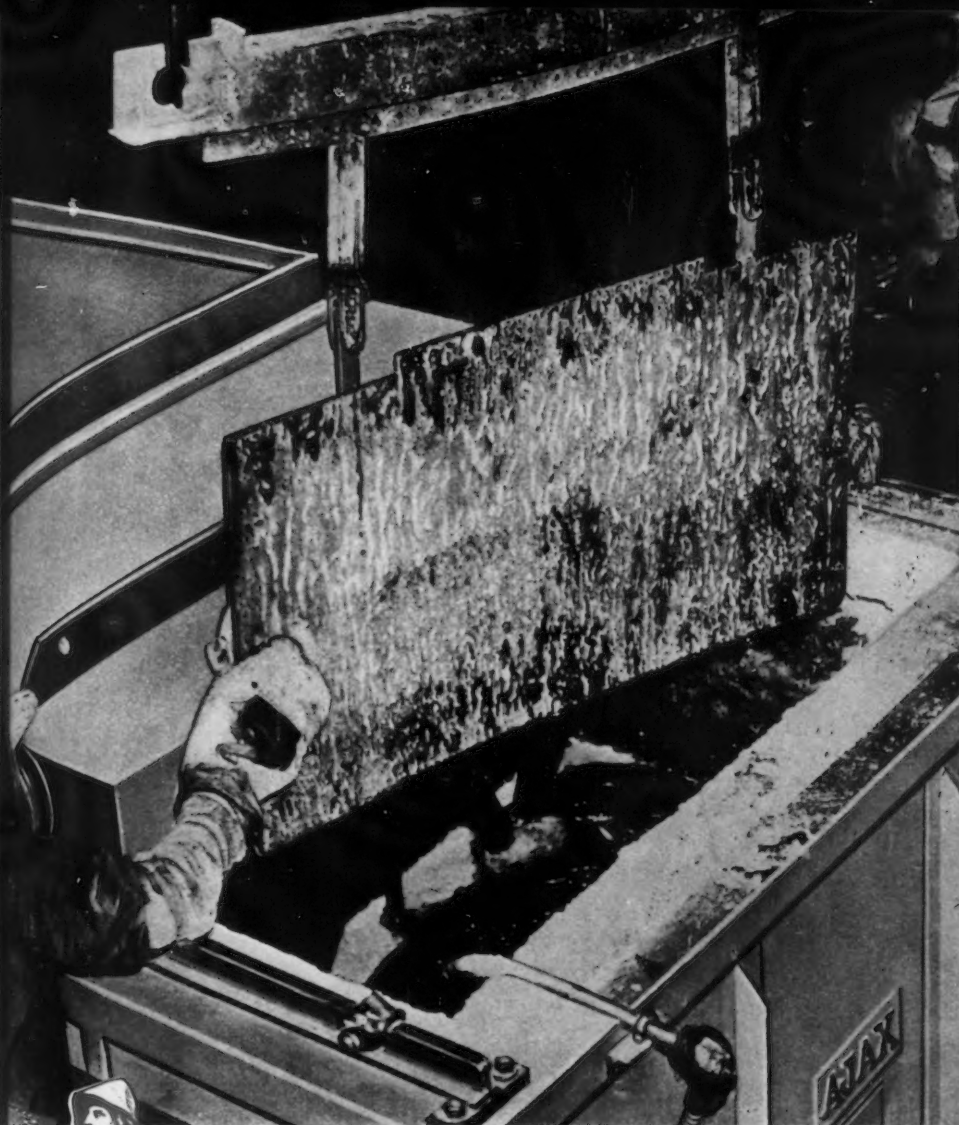
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Deep Case Carburizing Light Armor Plate
in Ajax Electric Salt Bath Furnaces

AJAX DEEP-CASE CARBURIZING IS HERE!

THIS IS IMPORTANT NEWS...

Case Depth of $\frac{1}{8}$ inch now
available with all the outstand-
ing advantages of AJAX-
Hultgren Salt Bath Methods.

HERE ARE THE KEY
PROCESSES TODAY...

- CARBURIZING
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- NEUTRAL HARDENING
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- SELECTIVE HEATING
- AGE HARDENING
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STEEL TOOLS
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- BRAZING
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FASTEST, SUREST MEANS TODAY..

Metallurgists have long sought to produce greater case depths in liquid baths because of the outstanding merit of the method—a merit attested by the *hundreds* of Ajax-Hultgren carburizing installations turning out light and medium case work on the high-volume production lines...

AND NOW THE METHOD IS AVAILABLE—tested conclusively, adopted, *already producing heavily*—for cases up to $\frac{1}{8}$ inch, in the Ajax immersed electrode salt bath furnace. This is vitally important, because now, even for these deeper cases, *you can depend upon:*

1. Freedom from uneven heating, distortion, soft spots, decarburization—in such things as splines, cam shafts, armor plate, and other parts now pack or gas carburized...

2. Faster carburizing cycles and ease of handling, with *no* compound, *no* boxes, *no* delicate manipulation of atmospheres.

3. Uniform deep case in all areas, even edges, pitch, or bevels of complicated gears...

4. Simplicity. You quench directly from the bath or transfer direct to a bath maintained at the desired quenching temperature and eliminate the need to re-heat for hardening.

Moreover, Ajax furnaces require no uncommon skill to operate. Their first cost is low, and their continuous *low maintenance at high output* means freedom from breakdown or interruption—the important thing today. Get the details of this new liquid bath method for deep case carburizing. Write us, and ask for Catalog 107.

AJAX ELECTRIC COMPANY, INC.
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THE **AJAX** ELECTRIC SALT BATH FURNACE HULTGREN

ASSOCIATE COMPANIES: AJAX METAL COMPANY, Non-Ferrous Ingot Metal for Foundry Use
AJAX ELECTRIC FURNACE CORPORATION, Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORPORATION, Ajax-Northrup Induction Furnaces for Melting, Heat-Treating

Fatigue Cracks

BY A. H. DIX

Slogans

Rae Leedom, one of our writers, must have started something when, just barely over the threshold of 1941, he wrote this headline for an advertisement of the Armco Drainage Products Association:

"How Not to Get Caught
With Your Bridges Down."

At any rate I've seen a number of variations of it since then, including the one quoted in your Jan. 15 page. Could it have been telepathy, or perhaps great minds who think as one?

—Bill (Armco) McFee

Slogans are flashes of verbal lightning. While they awe and fascinate us, we are not competent to judge how much illumination one borrows from another. It seems, however, safe enough to grant that as in other fields of invention the perfect model frequently owes something to those which have gone before.

To illustrate: Ambrose Harle, of the Savanna, Ill. Proving Grounds has been patted epistolarily on the back by the War Dept. for this, "The man who relaxes is helping the Axis."

While the slogan has a superficial excellence, it is basically unsound and may do much harm, for the man who doesn't relax occasionally will end up with ulcers. So we have tried to improve it, but so far we have not been able to do better than, "The man who is lazy is helping the Nazi," and "He who loafs aids the. . . ." As this issue goes to press we are still looking for a suitable word ending in "oaf." If you have any suggestions, they will be welcome.

Heavy, Heavy . . .

• • • While in the mood you might also try to carve out a slogan for the Advertising Department, which needs something to wave when bragging, as it will do at the drop of a rate card, that your favorite family journal published 5,360 pages of advertising in 1941, the world's largest.

So far we have two offerings. Dwight C. Warren evolved this, "Advertising Volume is the Index to Advertising Acceptance and Advertising Power," and Bob Blair is responsible for, "Advertising Gravitates to the Leading Publication in its Field."

While each enunciates a great truth, the footwork is pachydermic. We want something with a higher strength-weight factor.

Vitamins for Your Vocabulary

• • • If Henry L. Mencken is collecting material for a new edition of his *The American Language* we hope he noticed that the Roberts Commission's report on Pearl Harbor contains a use of *alert* as a verb—"should have alerted." First time we've seen it.

Another new one to us is the word *flee*. We saw it in the leading article in the Annual and though it was a typographical error, but it is in the dictionary all right, and, as of course you know, means *jeer* or *sneer*.

Noble Name

On the list of faculty members of the University of California I saw Fairfax Proudfoot Walkup, A.B. Striking, what?

Yes, indeed.

—R. R. Kay

"D" in Long Division

• • • Last week we bragged that our subscription renewal figure had attained the Pike's Peak level of 81.68 per cent. But we erred. We divided wrong. The right figure is 81.75 per cent. Sorry.

High Manganese Facade

• • • You might think that at a time like this English industrial advertising would be only so-so in quality because of lack of time. But the opposite is the case.



The English trade journals are studded with advertisements of striking and original character.

As an example, the January issue of *Aircraft Production* has an advertisement by George Ellison, Ltd., Sheffield, consisting of a full-page photograph, containing just four words from a speech of Winston Churchill's, ". . . our traditional unrelenting tenacity."

The model, as you see, is the very personification of the Prime Minister's phrase. He looks like a man who never in his life said, "Well, it's six o' one and half a dozen of the other." What we would like very much to know whether he is actually as steadfast as he looks. Psychologists say that people's qualities are mirrored in their faces, but some judges look like pickpockets, and some pickpockets look like judges.

Pat Blunder

As in the case of many newly organized defense plants, our office has taken on quite a large clerical and stenographic force. Some are not altogether familiar with technical terms, as is shown by a memo this department received recently from our Purchasing Department, in which the writer's title is given as "Metal Urger."

But after all, this is not as funny as it seems at first glance. In fact, it is rather appropriate.

—Walter M. Mitchell, Chief Metallurgist,
York Safe & Lock Co. Special Ordnance Plant, York, Pa.

Incorporated Mouthfuls

Speaking of long names, many years ago when I was with a publishing house we had an English firm on our books. The name was The Simpkin, Hamilton, Marshall, Kent & Co., Limited.

—E. V. Morrow,
Neveroil Bearing Co., Wakefield, Mass.

We are proud of ours—United Merchants & Manufacturing Management Corporation.

—C. L. Mantell, Technical Director

Believe it or not, we have received checks signed, "The Rector, Church Wardens and Vestry of The Protestant Episcopal Church of St. Marks in The Bouwerie in The City of New York."

—John C. Sanford,
Bruce & Cook, Inc., New York

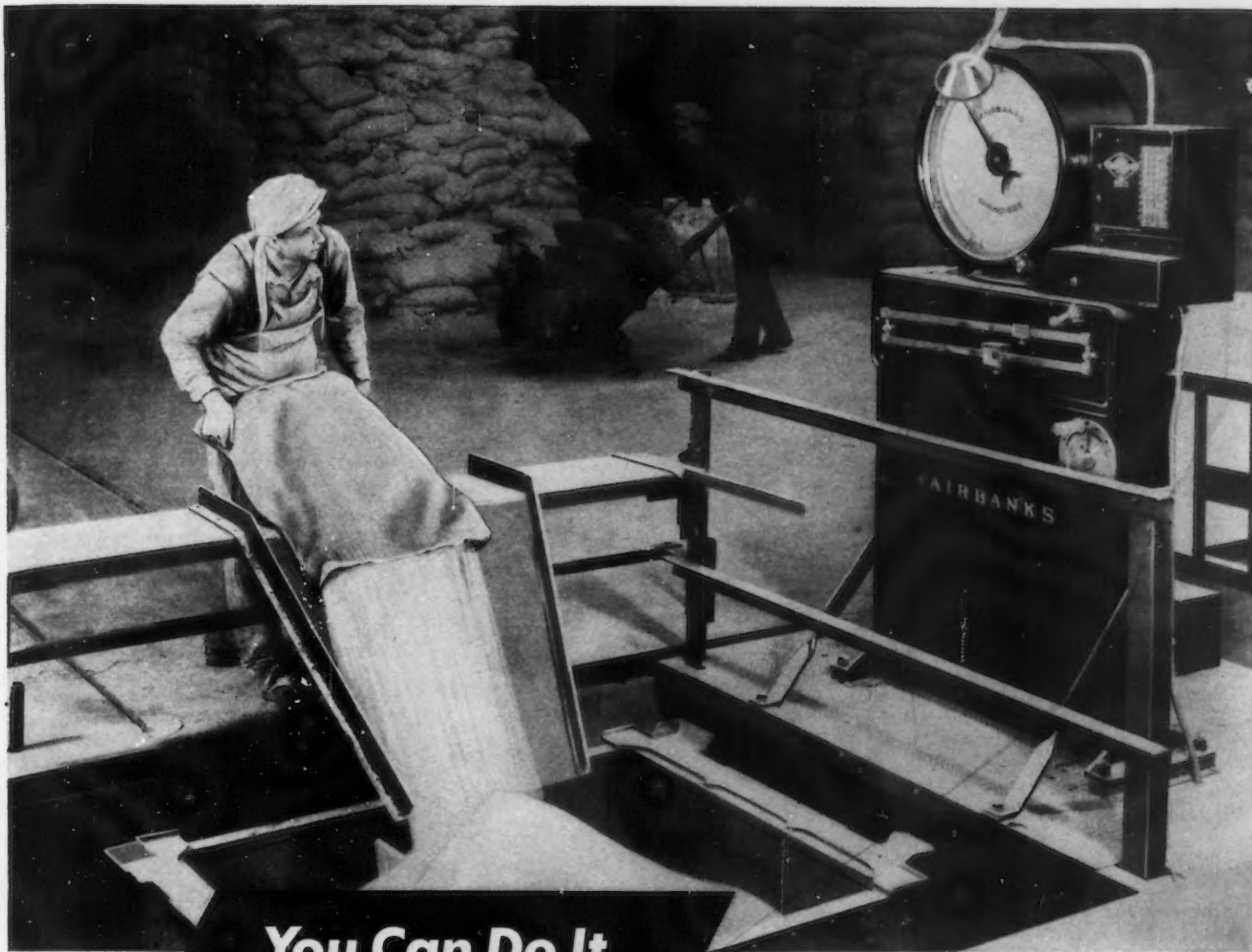
We know one man who could get even the last one on the bottom of a check without crowding. He is A. H. Rahmann of the George Rahmann Belting Co. If we can get his permission, we will reproduce his signature here next week so that you may marvel at it, as we did when we saw it recently at the bottom of a \$6 check.

Problems

Last week 239 cats each killed 4649 mice.

The time allowance on this is four minutes:

What quantity of four digits will produce a quantity with the same four digits in reverse order, when multiplied by 4.



You Can Do It
FASTER
 with
MODERN SCALES

To speed compounding of materials, this Fairbanks Dial Scale was built into a charging car which travels in a pit. At the touch of a button the Printomatic gives an accurate printed record of each batch.

● Rare is the weighing job which can't be done faster and more precisely with today's vastly improved scales. These scales *print* weight records more quickly than a man can read and write them. They *eliminate human errors*. They weigh while materials are *on the move*.

But—important as those advantages are—don't dismiss modern scales as nothing more than better weighing instruments. For scales have assumed amazing *extra* functions which often speed production surprisingly. They *count* small parts and products. They

furnish weight records for accounting and inventory control. They weigh and disburse preset amounts *automatically*, and can keep ingredient proportions *secret*!

WE WANT TO HELP YOU

We are anxious to do everything we can to help speed American production. Possibly our scale engineers could suggest new and more efficient applications of scales in *your* plant, or modifications of your present scales to attune them to today's tempo. Write Fairbanks, Morse & Co., Dept. B38, 600 S. Michigan Avenue, Chicago, Illinois. Branches and service stations throughout the United States and Canada.

FAIRBANKS · MORSE  **SCALES**

DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
 PUMPS MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

Dear Editor:

TESTING FOR CRACKS

Sir:

We are in search of a method of testing steel for seams and cracks of any nature . . . We would appreciate any information available on testing for cracks in steel.

W. JOHNSTON

Wendt-Sonis Drill Works
Hannibal Mo.

• Magnafluxing (Magnaflux Corp., 5908 N.W. Highway, Chicago) X-raying, Gamma-raying and magnetic analysis are all non-destructive means of determining flaws, both internal and external. Articles on these subjects have appeared in *THE IRON AGE* on April 10, 1941, p. 57; Oct. 9, 1941, p. 64; Oct. 17, 1940, p. 75)—Ed.

WHERE IS HALL PUMP?

Sir:

Quite some time ago we purchased several pumps manufactured by the Hall Steam Pump Co. of Pittsburgh. We understand this firm is out of business. Can you tell us who this company's successors are?

G. J. SPEAR

Cumberland Steel Co.
Cumberland, Md.

• Can any of our readers help Mr. Spear?—Ed.

TOOLS FOR DEFENSE

Sir:

I think the following letter which I clipped from the *Milwaukee Journal* is excellent. Don't you?

W. H. BROOKS

Carnation Co.
Oconomowoc, Wis.

To The Journal: About six months ago I was honorably discharged, as a sergeant, because of dependency, from the United States army. I now have a job as a tool room tender in this city.

As I was examining some tools that were accidentally broken, I thought of the army and suddenly it came to me how important these tools are to the men of the service—army, navy, marine corps and air corps. Especially when these tools are hard to replace.

Every tool I have in my tool room is like a key to a room full of munitions, guns, planes, ships and so forth. For the tools really are something with which we open the doors to this vast defense program. Without them men would never attain the speed which makes our defense work zoom ahead. Even the machines are powerless without the tools, as they are the arms and legs of the machines.

I would like you to print something so that it can come to the attention of all men who work in factories.

Although they are not considered the fighting force, much depends on these men behind the men behind the guns. They are helping America to win this war. The man behind the gun is looking to us to supply him. To make the things that he needs we must not only have the will to make them but we must have tools—tools and materials. So please don't waste or misuse any tool or material. And remember that only a saboteur would destroy them.

A soldier protects his country and himself with his rifle. You can protect your country and yourself and the soldier. Take care of tools and materials, a small thing to ask but one of the steps up the ladder of victory.

LEONARD V. PONIEWAZ.

2318 S. 6th St.
Milwaukee

• A message that should be on every bulletin board! Congratulations to Mr. Poniewaz, who is employed by Allis-Chalmers.—Ed.

FEDERAL AWARDS CENSORED

Sir:

Kindly advise if you have discontinued publishing government awards in your weekly issues.

P. H. JOHNSON

G. S. Blakeslee
Chicago

• Publication of the awards was discontinued at request of Army and Navy on grounds that they represented information of value to the enemy. However, the need of many plants for this information in their attempt to convert their facilities to war work has caused the censorship agencies to reconsider the question. No decision has been reached yet, but one is expected soon. We shall resume publication of the awards as, if and when permission is granted by the censor's office.—Ed.

SHELL BLANK SIZES

Sir:

We are very much interested in obtaining information regarding blanks for various sized shells. Such information should consist of a list of sizes showing depth and width of the drawing, coupled with the blank needed to produce the shell. Can you help us?

R. R. SADLER

Unique Metal Novelty Mfg. Co., Inc.
North Bergen, N. J.

• The Ordnance Department has such information. The following books also contain information of that nature: "Die Designing and Estimating," American Industrial Publishers, 2460

Fairmount Boulevard, Cleveland;
"Press Working of Metals," McGraw-Hill Book Co., 330 West 42nd Street, New York; "Punches, Dies and Tools," Norman W. Henley Publishing Co., 17 West 45th Street, New York.—Ed.

DETINNING TIN CANS

Sir:

Due to the serious situation in the tin supply caused by the war in the Pacific, we have been wondering down here whether the collection of tin cans and the reclamation of tin from such would be important?

MANAGING DIRECTOR

United Nail & Foundry Co., Ltd.
St. John's, Newfoundland

• The Pacific crisis is focusing new interest in the salvaging of tin from tin cans. Two large plants, which handle mostly clean skeleton from stamping plants, have been active for some time in the east. However of late much publicity has been given to alleged detinning tin cans by burning. For instance, the Jan. 22, 1942, issue of *THE IRON AGE*, under the caption, "Burned Tin Cans Being Charged by Scrap-Hungry Mills," reports, "in the East scrap collectors for several months have been burning tin off old cans in bon-fires and sending the charred scrap to steel plants." The Dec. 18, 1941, issue of the *Journal of Commerce* reported that about 1600 tons monthly of scrap was being shipped out from 53 Army Camps, the cans "being burnt to remove tin, solder and foreign material."

It is well known that tin cannot be removed by burning — it alloys with the steel. Quoting Clyde E. Williams, Director of the Battelle Institute, "it is impossible to remove tin from tin plate by simple heating operation; such treatment changes the color but does not reduce the tin content . . . if present in amounts of 0.1 per cent or more (it) causes serious cracking of the steel during rolling."

Investigations by various companies show that burnt tin cans of average size retain 1 per cent to 1¼ per cent tin. Detinned tin plate scrap today contains well under 0.01 per cent, including a material percentage of tin in the steel itself, i.e., in the black sheet before tinning.

It is well to emphasize the serious and lasting results that may well ensue from charging openhearth with large tonnages of scrap containing 1 to 1¼ per cent tin. Furthermore, detinning, as practiced by the detinning companies, should not be associated with "detinning cans by burning."—Ed.

FOR TOUGH CONTINUOUS
PRODUCTION WELDING

6 out of 10

UNIONMELT* LICENSEES
USE WESTINGHOUSE
FLEXARC WELDERS

HOW TO BUILD SHIPS FASTER
... With the Unionmelt Process $\frac{1}{8}$ " to $1\frac{1}{2}$ " plates are butt-welded in one pass at speeds up to 80" per minute. Welds meet all code requirements, too.

4 GOOD REASONS WHY

1. Heavy-duty 1,000-ampere Flexarc A-C Welder was designed especially for use with the Unionmelt Process; 500-ampere model has built-in 100-volt open circuit tap which adapts it for use with the process.
2. Flexarc A-C Welders have single dial current control, quickly preset or changed under load.
3. Built-in capacitor provides high power factor—high efficiency, low kv-a input.
4. Welding transformer design has ample copper and iron to prevent loss of efficiency through "overworking" these parts in heavy current, semi-continuous operation.

SINGLE UNIT COMBINES CONTROL AND TRANSFORMER

SPEED STARTS HERE... Flexarc control unit combines both a-c transformer and control cabinets. Nothing to wire on the job. Voltmeter and ammeter shown are optional. Capacitors for improving power factor also optional. Push buttons control current.

For today's defense shipbuilding, construction, fabrication and other operations requiring mass production of butt-welds, the Unionmelt* Process is supplying new and faster welding than ever before possible. The process is simple and semi-automatic, producing sound, continuous welds as much as 20 times faster than by other methods. Important in the increasing use of this timesaving welding process is this fact: production-wise Unionmelt licensees use more Flexarc Welders than all other kinds combined!

MORE FACTS FOR YOU

For a complete story on how this team—Unionmelt Process with Flexarc Welders—can help solve your production welding problems, just see your Westinghouse representative—or write Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Department 7-N.

(*Unionmelt* is a registered trade-mark of the Linde Air Products Co.)

Westinghouse

FLEXARC A.C. WELDERS



This Industrial Week . . .

TWO months of active participation in the war has brought drastic changes in some of the normal distribution practices in the steel producing and consuming industries but these changes, it seems, are but a sample of things to come.

Customer relations built up over the years have already been upset because of steel allocations and the priority system and before long may be completely altered except in cases in which these customers present high preference rated orders for Army, Navy, Maritime and Lend-Lease requirements. Added to alterations in the customer relations picture are the equally important changes taking place in steel markets where use of steel has been built up in peacetime.

While forcing production to the highest possible levels, steel manufacturers each day are seeing new names on their order books. Older customers are obtaining steel from regular sources of supply as long as their orders are accompanied by high priority ratings, but are having little luck in obtaining material with ratings below A-3. Not only the makers of products for purely civilian use, but the manufacturers of metal goods for essential civilian needs are likely to face a continuance of the blows which accompany war shortages. Where many plants (household appliance makers, for example) are able to obtain the steel they need to operate on a reduced schedule, shortages of other materials and of equipment are interfering with production.

Railroads Allotted First Quarter Needs

In all sections of the metalworking industry, developments continue to come thick and fast (see THE IRON AGE Priority and Price Summary, page 100D). The railroads have been allotted 900,530 tons of steel and 2250 tons of copper for the first quarter of 1942, provided the requirements can be met without interfering with shell

steel which is rolled on mills primarily engaged on rail output. This quarterly rationing was announced by War Production Board chairman Donald M. Nelson after conferences of the Railroad Industry Advisory Committee with the Transport and Farm Equipment Branch of the WPB Division of Industry Operations. The first quarter tonnage allotted to the railroads falls considerably short of the amount asked by the carriers for that period and the balance of 1942.

Rail Requirements Put at 538,000 Tons

Broken down by types of tonnages the WPB first quarter steel allocations to the railroads are: Rails 538,000 tons; fastenings 294,000, and plates, shapes and rails for other uses 63,530 tons. Adjustments, the WPB said, will be necessary in the following quarters to meet each road's requirements as determined by the survey now being undertaken by the Office of Defense Transportation. Steel allotted to the carriers for the first quarter is for essential safety and service needs and is not intended for general expansion or additions to existing equipment. For the railroads, a big question in the first quarter will be: Will steel shipments to us interfere with shell production?

Under a ruling this week by Price Administrator Leon Henderson, exporters of iron and steel products are permitted to charge certain margins over the domestic ceiling figures. The ceiling covers exports to any place outside the territorial limits of the United States. The maximum is set as the domestic price, freight alongside ship at the port from which shipment is being made, plus an amount not more than 5 per cent in excess of the price at which the material is invoiced by the domestic seller, in the case of an export agent. Export merchants are to be allowed a 10 per cent maximum mark-up above the price at which the material is invoiced by the domestic seller. Mr. Henderson pointed out that although margins allowed by this revision to the iron and steel products price schedule No. 49 are above domestic ceiling prices, exporters who are receiving discounts from mills and others may continue to receive them.

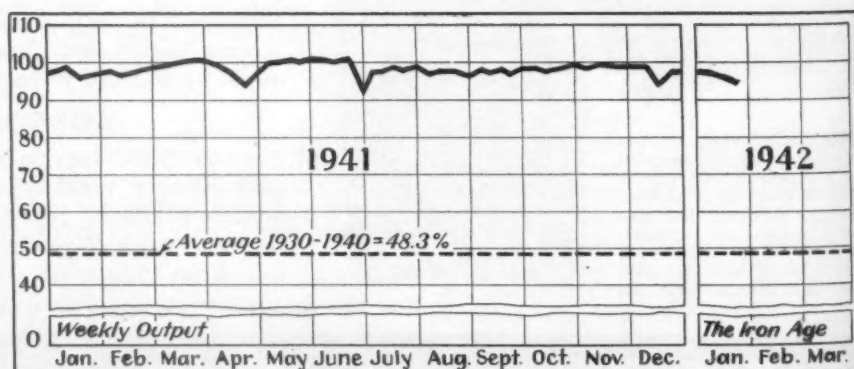
Revise Export Prices Under Schedule No. 49

Sales by persons other than export agents or merchants are not affected by the above developments. Mill export sales of steel still are governed by provisions of price Schedule No. 6. Warehouse export sales are covered by domestic ceiling prices established under price schedule No. 49.

Meanwhile, charges of "serious

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	South-ern	S. Ohio	West-ern	St. Louis	East-ern	Aggre-gate
Current Week.....	96.0	103.0	97.0	96.5	98.0	92.5	98.0	108.0	96.5	104.0	96.0	75.0	108.0	96.5
Previous Week.....	97.0	103.0	97.0	91.0	97.0	90.0	98.0	100.0	96.5	101.0	96.0	87.5	98.0	97.0

Guide Takes Mystery Out of Priorities

"The most complete and helpful description of priorities and allocations available. It takes the mystery out of priorities. Please send me 50 additional copies, as I want each member of my sales force to have a copy of this valuable Guide."

That's the way a large metal working plant describes *THE IRON AGE* Priorities and Allocation Guide which was published with the issue of Jan. 29. Requests for additional copies are pouring in by mail, telephone and telegram. If you need additional copies, write to *THE IRON AGE* Reader Service Department, 100 East 42nd Street, New York.

One to 10 copies are priced at 25c. each; 11 to 100 copies, 20c. each; 101 to 300, 18c. each, and more than 300 copies, 15c. each. Stamps or coin with orders for less than \$1 would be appreciated.

violations" of the priority regulations by some steel producers are said at Washington to have little chance of being pressed. A report by Federal Trade Commission examiners regarding these violations may not be made public since some WPB officials are said to believe that priority violations in steel have been caused largely by ignorance of the workings of the priority system and by difficulties of some companies in getting interpretations of what some sections of the priority orders affecting them mean. Clearer understanding of priorities has reduced the number of violations to a handful.

Tighter Controls Set On Second-Hand Tools

Another development of interest to the metal working industry is the issuance of general preference order No. E-4 under which sales and deliveries of second-hand machine tools will be more closely controlled. The order, issued Monday by J. S. Knowlson, director of WPB's Division of Industry Operations, makes all provisions of priorities regulation No. 1 apply to transactions in second-hand tools, just as these provisions apply to sales and deliveries of other merchandise. Mr. Knowlson may now prohibit the sale or other disposal of any specific second-hand machine tool until further notice. In such instances he will determine the plant to which a particular tool should be allocated and issue an allocation order.

Steel Ingot Output Eases to 96.5 Per Cent

Steel making operations this week stand at 96.5 per cent of capacity, a half point drop from last week's 97 per cent rate, according to *THE IRON AGE* estimates. The fractional decline is a normal fluctuation. While scrap supplies still are extremely light, juggling of supplies through allocations is tending to prevent a sharp drop in any single district. Some furnace operators report, however, that while they are maintaining all units in production, the yield per heat has dropped to as low as 60 per cent of normal.

Pittsburgh district operations this week are down a point to 96 per cent, while Chicago and Youngs-

town are unchanged at 103 per cent and 97 per cent respectively. Philadelphia eased a half point to 90.5 per cent, while the Cleveland rate dropped 9 points to 97 per cent. Buffalo gained 2.5 points to 92.5 per cent and Wheeling is holding at 88 per cent. Detroit operations started this week at 112 per cent, but were expected to be down to 100 per cent by mid-week, with an average of 106 per cent for the week. A gain of three points to 104 is reported in the Southern Ohio River area while the eastern district rose 8 points to 106 per cent.

Steel Companies Invade Graveyards

To break the scrap shortage, steel companies during the past week have been sending labor gangs into automobile graveyards. This is a new practice and results from the desperate need for scrap metal. At least five steel companies in the Mid-West and one in the East have entered the auto wrecking business. Under one method, the auto wrecking company is offered a price for old cars, the steel company moves in its labor gang, and the owner of the yard is allowed to specify the parts he wants set aside for his use and sale. Usually the motors, front and rear axles and smaller parts are kept by the yard owner. The mills estimate that two men may wreck up to 10 cars a day. The wage costs in this plan of scrap salvage, including hauling costs and yard conversion, with no profit to the agent acting for the steel company, in some cases brings a net price of \$2 or more above the fixed maximum price ceiling.

A few days ago E. C. Barringer, executive secretary of the Institute of Scrap Iron and Steel, declared that 500,000 tons of scrap cannot be taken out of the nation's

coal mines because the CIO refuses to adjust overtime rates, and that CIO officials have interfered with scrap collection and shipments. Mr. Barringer answered a statement by CIO president Philip Murray, who sought to blame scrap men and steel mill executives for many of the ills of the war program.

Early this week one of the largest domestic shell programs so far was shaping up to completion. Already allocations for hot rolled shell steel have been made or are on the point of being made to several steel companies. It is said that approximately 1,000,000 tons is scheduled for almost immediate allocation in a program which will require 4,000,000 tons of steel. Recent developments indicate that the amount of shells to be made from cold drawn steel is somewhat greater than was expected a week ago.

Iron Allocations Worry Producers

Pig iron producers have finally received their February allocations which set furnace production schedules at approximately the same level as January with no allowance for the shortness of the current month. This allocation is a source of worry to some producers, since they believe that February will end with some high rated orders unfilled. Some observers have felt that the WPB might have taken it upon itself to decide which orders should not be filled during February, instead of leaving this task to the furnaces.

With the steadily increasing demand for high carbon strip steel to go into machine gun clips and rifle bullet clips, existing capacity is expected soon to be taxed. A bottleneck is the insufficiency of heat treating furnaces.



**J&L
STEEL**

**J&L CONTROLLED QUALITY
SHEETS**

*produced by the teamwork of science and
skill—piloted by research.*

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

J&L—PARTNER TO INDUSTRY FOR VICTORY

News of Industry

• • •

Tin Mill Slowdown Points to New Labor Disputes at Chicago

Gary, Ind.

• • • A slowdown in the sheet and tin mill of Carnegie-Illinois Steel Corp. here, coupled with a union statement that dues picketing of the Chicago district steel mills might take place by this week's end, is taken as an augury here of renewed labor trouble for the steel industry. The slowdown of 80 reckoners here culminated in the enforced layoff Saturday of 1,900 employees engaged in tin mill operations.

The reckoners, who stack tin plate in base boxes, had piled up work behind them because theirs is the second last step before actual shipping and all previous operations had to be slowed down.

The 80 slowdowners are asking for increased incentive bonus, allegedly basing their argument on the fact that base boxes holding tin plate for armament use such as shell packing cases weighs more than the average base box. The union is said to have cited a two week period as example of how their pay fell below the average of \$1.45 per hr. because of heavier base boxes, while the company contends study of the same two weeks showed reckoners averaged \$1.50 hourly for the period.

CIO district officials have unofficially stated that dues picketing will be resumed this weekend at most steel mills in the Chicago district. One large mill here said early this week that it expects its labor powder keg to blow any moment. With the Steel Workers Organizing Committee expected to



Photo by International

SINKING OFF LONG ISLAND: The First Air Force at Mitchel Field, N. Y., released this photo of the 6768-ton tanker "Coimbra," sliding into the sea after being torpedoed off Long Island about 100 miles east of New York. An oil slick trails over the water. Such sinkings emphasize the need of higher production of ships from American yards.

take its case for higher wages and a closed shop against "Little Steel" to the War Labor Board shortly, steel men here think this district

will be used again as a guinea pig for a demonstration of union strength preceding the board's acceptance of the case.

Wives of Soldiers Get Aircraft Jobs

Kansas City, Kan.

• • • Giving preference to wives of men in military service, North American Aviation, Inc., has started placing women at work in the stock room and training girls for skilled factory jobs. Unofficially, it is said that the firm may finally have as high as 40 per cent of its payroll represented by women.

CIO Local Tweaks Lewis

Buffalo

• • • Republic Steel Local 1743 of the Steel Workers Organizing Committee (CIO) passed a resolution last week that no AFL-CIO peace move should be recognized unless it comes from CIO President Philip Murray.

Chrysler Plant Workers Vote 396 to 94 for CIO

Kokomo, Ind.

• • • After rejecting all union representation in two previous elections, employees of the Chrysler plant here recently voted 396 to 94 in favor of being represented by a CIO group—United Automobile, Aircraft and Agricultural Implement Workers of America. Five hundred and four of the 798 eligible workers participated in the election. Balloting was conducted by the NLRB.

Ohio Tool Gives Wage Rise

Cleveland

• • • The Ohio Tool Co. granted 800 employees wage increases ranging from 5c to 10c an hour, in a new contract with the Independent Tool & Metal Workers Alliance, Inc.

Henderson Gets Broad Price Power But New Act Has Faults

Washington

••• The price bill was signed last Friday by the President with the warning that the 110 percent of parity limitation on agricultural products might endanger the price structure. Mr. Roosevelt promised a vigorous administration. The Act delegates extremely broad authority to the price administrator to control prices but provides no control over wages.

Leon Henderson will continue as price administrator and all ceilings issued to date will be formalized by re-issuance. It was stated that only minor changes, chiefly in phraseology, will be made in existing iron and steel and related schedules. Mr. Henderson is given the power to prohibit manipulation, speculation and hoarding. It is his discretion which determines whether prices are rising or about to rise, and to take appropriate action.

But the price administration is given the power to manipulate markets to prevent inflation through buying, selling or storing a commodity, and he or any duly authorized representative may exercise the authority granted to the price administrator.

He has the power to grant licenses to sell in his discretion, and the power to recommend that they be revoked. The courts have jurisdiction over the actual revocation of licenses, however.

The impairment of contracts is permitted since after the enactment of the measure no price may be charged contrary to established schedules.

Violators of regulations or price schedules, including those who falsify records, are subject to \$5000 fine, to one or two years imprisonment or both. If any person selling a commodity violates a regulation, order, or price schedule, the buyer may bring an action for \$50 or for treble the amount by which the price he paid exceeded the applicable maximum price, plus reasonable attorney's fees and costs.

Some of the provisions of the Act are as follows:

The administrator has discre-

tionary power over the disclosure of information obtained from a business man, even though such information was given with the request that it be considered confidential.

Hearings on protest of a schedule may be limited to the filing of briefs, and while the Act says that the administrator must advise with members of an industry before the establishment of ceilings, he may establish temporary prices without such conference.

A special court called the Emergency Court of Appeals is set up with sole jurisdiction to set aside regulations or schedules, and the administrator is given the power to modify or rescind any order during the pendency of appeal before the court.



Ceilings on Wire and Cable

Washington

••• Effective immediately, OPA last Friday announced Price Schedule No. 82, which established formal ceilings on wire, cable and cable accessories at the Oct. 15, 1941, levels. The order supplants the informal request made to the industry on Oct. 29 of last year to maintain prices at not above the Oct. 15 figures.

Principal changes from the proposed price schedule submitted to the industry and the final schedule are as follows:

1. Maximum charges for drawing wire or rolling bars are provided.
2. Maximum price for weatherproof wire has been raised. This is due largely to sharp cotton price advances resulting in higher cost of cotton yarns used therein, and takes account of the special competitive situation existing on Oct. 15 last. Weatherproof wire maximum base price has been raised 2.375c. per pound over Oct. 15 levels to 17.5c.
3. Contract provision for price adjustment is limited to deliveries called for and made more than nine months from the date of contract. In such cases, final prices may not exceed maximum prices in effect at the date of delivery.

Requests for relief have been received by OPA from some companies manufacturing armored conductor cable. These requests are

under consideration currently and it is anticipated that a decision will be reached within the very near future, with the possibility that the ceiling order may be revised after it is issued, or exceptions granted.

Another feature of the new price schedule is an adjustment to cover about 50 percent of the recent 65c increase in lead prices. Manufacturers of lead-covered cable will be expected to absorb the remainder of this cost increase. It is emphasized that this provision in the order is temporary and subject to modification subsequently when OPA has studied data showing the effects of the lead price increase on costs and profits. Firm prices with no rebates on sales made during this period of study are permitted by OPA, however.

It was pointed out by OPA that since Jan. 1, 1941, prices of many types of electrical wire and cable have been raised between 5 per cent and 25 per cent. Output of these products is essential to both this country's war program and civilian economy, OPA said. Hence, it added, formal price ceiling is considered necessary.



Wilcox Heads Steel Section

Washington

••• Clair Wilcox, professor of economics at Swarthmore College and consultant to the National Resources Planning Board, has been appointed price executive of OPA's Iron and Steel Section, and Roswell Whitman, formerly of R. H. Macy & Co., New York, has been appointed director of planning and policy development for steel prices.

Mr. Whitman has been in charge of OPA's Iron and Steel Section since 1941. In his new position, it was announced by Assistant Price Administrator J. K. Galbraith, Mr. Whitman will be charged with developing the longer range policies for the administration of prices of iron and steel products and the components for their manufacture.

Mr. Wilcox has been professor of economics at Swarthmore for the past 11 years and also holds the chair in that college's department of economics and division of social sciences. He will assume general responsibility for the ad-

Announcing the

1ST WESTERN HEMISPHERE FOUNDRY CONGRESS



To Promote Hemisphere Solidarity

As a step toward furthering the Government's Good Neighbor policies, Hemisphere Solidarity, and to further a united effort on the part of the foundry industries in all the Americas, a Western Hemisphere Foundry Congress will be staged in conjunction with the 46th Annual Convention of A.F.A.

Organized as a Common Defense effort, the murderous attack on PEARL HARBOR and Declaration of War with all Axis powers changes the program to an ALL-OUT effort of the Foundry Industry for increased production of WAR MATERIALS.

Therefore, the Congress, Convention and Show in Cleveland next April will be a Demonstration of the Foundry Industry's Contribution to, and support of, our President's pledges of "COMPLETE VICTORY."

*For information about
Convention and Exhibit address*

**American Foundrymen's Association
222 W. Adams Street. • Chicago**



**FOUNDRY and ALLIED
INDUSTRIES SHOW**

Cleveland,
APRIL 20 - 24, 1942

ministration of OPA's Iron and Steel Section. He is author of TNEC's monograph on "Competition and Monopoly in American Industry."

Brass Schedule Operating

•••The suggested maximum price list for brass and bronze ingot (IRON AGE, Jan. 8, page 79) has been accepted by ingot makers and was placed in effect Feb. 1, OPA announced. The schedule, which has not been assigned a number, covers 95 per cent of all brass and alloy ingots. All are for ingot delivered to the buyer's place of business, except that freight in excess of 25c per hundred pounds may be added. A premium of $\frac{1}{4}$ c per lb. also may be added where ingot is sold and delivered in less than carload lots.

Formal Ceiling on Zinc

•••Formal price ceilings are established for primary slab zinc on a basis of 8.25c per pound, f.o.b. East St. Louis, for prime western grade, effective Jan. 29, 1942, under Price Schedule No. 81. An informal price ceiling has prevailed at this level since Oct. 9, 1941.

In the new schedule, any sales of primary slab zinc to Metals Reserve Co., resulting from output in excess of WPB and OPA quotas, shall be excepted from maximum price provisions. Such sales are to be made in accordance with the premium price plan announced by OPA, WPB, and MRC.

Quantity differentials on primary slab zinc under the new schedule are patterned exactly after those in the primary lead order. Grades of primary slab zinc established under the schedule are in accordance with specifications of the American Society for Testing Materials. Primary slab zinc which fails to meet such standards should be sold at normal differentials below the established maximum prices. However, in the case of "tailor-made" zinc—viz, that made by a producer to conform with individual specifications required by a particular customer—

such producer must submit to OPA necessary information for determination of the maximum price that may be charged in each instance.

The new zinc schedule also provides that persons desiring to sell for export at prices over the maximums shall file with OPA, prior to execution of such sales, complete information regarding the transaction, including the export commission desired.

MAXIMUM BASE PRICES FOR PRIMARY SLAB ZINC

Grade	Base Price Per Lb.
Prime western	8.25c.
Selected	8.35c.
Brass special	8.50c.
Intermediate	8.75c.
High grade	9.25c.
Special high grade	9.25c.

IN CARLOAD LOTS

Grade	Max. Price Per Pound, Del'd at Buyer's Receiving Point
Prime western	Base price plus carload freight from East St. Louis to buyer's receiving point.
Selected	Base price.
Brass special	Base price.
Intermediate	Base price.
High grade	Base price.
Special high grade	Base price.

IN LESS-THAN-CARLOAD LOTS

Sales By Producers

	(Maximum Price Per Lb., F.o.b. Point of Shipment)	
	Prime Western Selected	High Grade Special High Grade
	Brass Special Intermediate	
20,000 lbs. and less than a carload	Base price plus .15c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .15c.
10,000 lbs. and less than 20,000 lbs.	Base price plus .25c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .25c.
2,000 lbs. and less than 10,000 lbs.	Base price plus .40c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .40c.
Less than 2,000 lbs.	Base price plus .50c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .50c.

Sales By All Persons Except Producers

	(Maximum Price Per Lb., F.o.b. Point of Shipment)	
	Prime Western Selected	High Grade Special High Grade
	Brass Special Intermediate	
20,000 lbs. and less than a carload	Base price plus .65c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .65c.
10,000 lbs. and less than 20,000 lbs.	Base price plus .75c. plus carload freight from E. St. Louis to point of shipment.	Base price plus .75c.
2,000 lbs. and less than 10,000 lbs.	Base price plus 1.00c. plus carload freight from E. St. Louis to point of shipment.	Base price plus 1.00c.
Less than 2,000 lbs.	Base price plus 1.50c. plus carload freight from E. St. Louis to point of shipment.	Base price plus 1.50c.

Non-ferrous Scrap Session Produces Numerous Queries

•••OPA is building up a corps of inspectors at each regional office and is preparing to check closely on adherence price schedules, a meeting on the subject of non-ferrous scrap prices in Hotel Roosevelt, New York, was told Jan. 29 by George R. Taylor, assistant price executive of the copper and brass section of OPA.

The session, similar to one held previously in Chicago, brought out many interesting questions from persons affected by non-ferrous scrap schedules, particularly the new schedule on lead. Kermit Gordon of OPA asserted that the gross wet weight of lead battery scrap at the time of assay governs the price settlement; that loss of weight in transit may not be used to evade the schedule; and that the customary 1.5 per cent deduction made by smelters is not a part

of the ceiling formula. Other questions and answers included:

Q—Are any steps being taken against public utilities selling on the "as is" basis with respect to quality? A—The seller is bound to respect ceiling prices just as much as the buyer.

Q—May a peddler or dealer who buys battery boxes for junk pay above the ceiling? A—He may.

Q—Is C.T. metal covered by price schedule No. 70? A—It may or may not be covered depending on the analysis.

Q—Is the wet assay basis formula mandatory in bidding? A—No, but the seller for his own protection should get a copy of the assay report and make final settlement after the assay report has been received.

Q—What is the base price of scrap lead when the point of shipment is not specifically mentioned in the schedule? A—The nearest basing point as the crowd flies.

Q—Is a smelter of lead who is also a dealer limited by the price ceiling? A—If he is a smelter he may not exceed the maximum price.

Q—Under the schedule for brass mill scrap may two dealers combine on shipments to get the quantity premium? A—Yes, so long as the brass mill deals only with one person.

Q—Under the schedule covering copper scrap may shipments be pooled? A—No.

Q—Can anyone pay the crucible shape premium for copper scrap? A—Yes.

3 New Chemical Schedules

••• Three new price schedules have been issued in the chemical field covering oxalic acid, carbon tetrachloride and lithopone. They are Schedules 78, 79 and 80, respectively, and were issued largely as a means of controlling resellers' prices. All are effective Feb. 2. Oxalic acid in 100-lb. lots or more is established at a maximum price of 11¼c. per lb., f.o.b. producer's shipping point (with freight equalization provisions). The maximum prices for carbon tetrachloride cover four zones, with the 73c. per gallon price (carload lots in 50-55 gal. drums) in Zone 1; 80c. in Zone 2; 94c. in Zone 3, and 83c. in Zone 4. For lithopone (normal grade) a maximum price of \$0.0425 per lb. is established. The schedule covers six grades in carload lots and less than carloads, for deliveries in two territories, eastern and western. There are also differentials for export sales with provisions for shipments by vessel from eastern and western territory to persons in territories and possessions of the United States, for overland shipments and for shipping expenses.

Request to Gear Industry

••• Manufacturers in the gear industry have been asked to refrain from selling gears, speed reducers and sprockets at prices higher than those in effect Oct. 15, 1941, OPA announced Jan. 29, following a meeting two days earlier in Washington with industry members. OPA will shortly issue a formal ceiling schedule, establishing maximum prices for gears, speed reducers and sprockets.

Metallic Lead Choices

••• Alternate temporary choices on maximum prices of metallic lead products and various lead alloys are granted producers of metallic lead products in a telegram sent them Jan. 28 by Leon Henderson. OPA now permits them either to hold to prices no higher than their prices on Jan. 2, 1942, or to charge no higher than their maximum April 1, 1941, price, plus .65-

cent per pound of lead content in the particular product. The request applies to all shipments made on or subsequent to the date of receipt of the latest telegram.

If both alternatives result in excessive hardship producers are permitted to use open billing. If open billing is used, written notification must be given OPA of producers' agreement to make final billings at levels not in excess of the maximum prices to be announced by Mr. Henderson's office. These alternate choices are of a temporary nature until such time as studies have been completed and formal maximum prices set.

Plea to Implement Dealers

••• With the demand for agricultural equipment running high and production reduced, OPA on Jan. 29 requested stabilization of implement and tractor prices by dealers. Prices should be held at levels no higher than those suggested by producers, plus actual freight and handling costs and sales taxes, OPA said. The request also pertains to parts. Dealers are asked to keep invoices for possible inspection by OPA.

Borax Price Rise O.K.'d

••• Advances of \$1 a ton on borax and \$2 a ton on boric acid, justified by increased production costs, were permitted in telegrams sent to members of the industry last week by OPA. The increase was permitted only after a 30 days' suspension of the advanced price by the American Potash and Chemical Corp., Trona, Cal., at the request of OPA, which refused permission until after its investigation had been made.

The OPA telegram to the American Potash and Chemical Corp., said: "Until March 24, 1942, you are requested not to sell borax and boric acid at prices in excess of the following per ton f.o.b. your plant, freight allowed to destination; borax, granular technical in bulk, \$41.50; boric acid, granular technical in bulk, \$95.50; regular differentials to apply to shipments in containers and to borax and boric acid sold in commercial forms." Other producers of borax

and boric acid, who voluntarily had withheld increases in price, also were notified of the maximum prices established.

Price Ceilings Put on Radios

••• Price Schedule No. 83 covering non-commercial radio and television receiving sets, portable radio sets, automobile radios, television sets and electric phonographs was announced Jan. 30, with Price Schedule No. 84 covering tubes and parts, both original and replacement, whether current or old. Ceiling prices of sets and parts are fixed at the highest net prices received on Oct. 15, 1941, or the three month period prior to that date. No new models can be marketed after Feb. 9 unless prices are first approved by OPA.

Amendments

Schedule No. 42 (Paraffin Wax)—Freight equalization provisions eliminated and replaced by f.o.b. sellers' shipping point basis; other changes; effective Jan. 30; issued Jan. 28.

Schedule No. 32 (Paperboard)—Wholesale distributors permitted operating margin by Amendment 5.

Voluntary Actions, etc.

Black & Decker Mfg. Co., maker of power driven, portable tools, withdrew price increases made Dec. 15 and is issuing new price lists based on Oct. 1 levels.

Makers of electric hearing aids were asked Jan. 28 by OPA not to increase their prices above those in effect Oct. 15, 1941.

Ceiling on Autos

••• Price Schedule 85 covering new passenger automobiles, issued Feb. 2, sets maximum wholesale and retail prices at the highest price prevailing for the same make and model between Oct. 1-15, 1941, for the same class of purchaser, except that in the case of Packard Motor Co. and Crosley Corp. the maximum shall be the highest price prevailing Feb. 2.

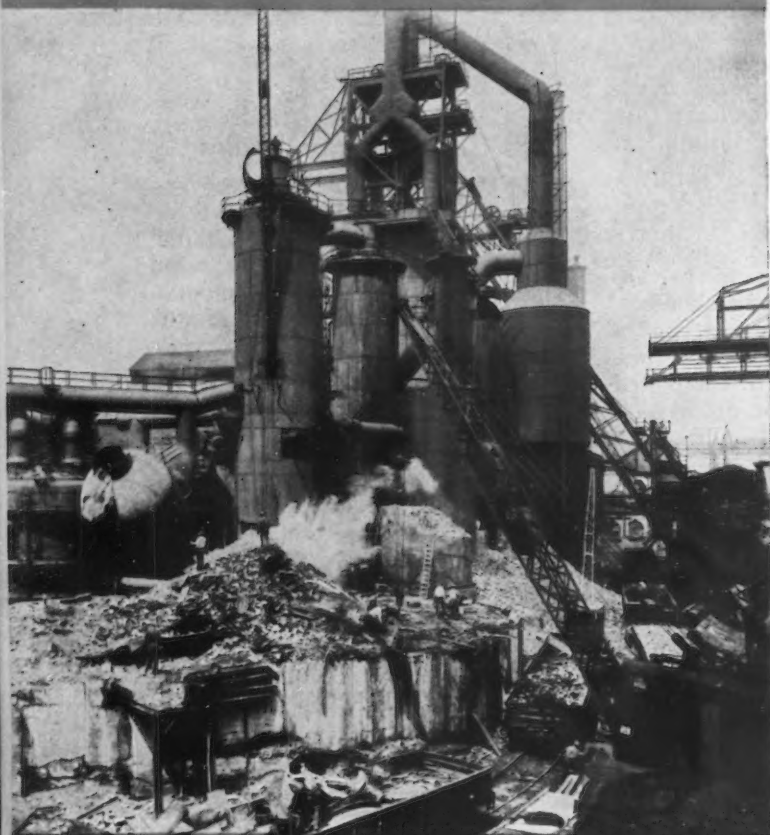
If the auto lacks equipment which was standard Oct. 15, the maximum price must be lowered by the wholesale value of the equipment removed.

To the maximum price may be added an amount equal to 1 per cent of the list price of the auto, or \$15, whichever is lower, for each calendar month or greater part thereof, after Jan. 31, 1942, which elapses prior to the sale of the auto by the maker, distributor or exporter.

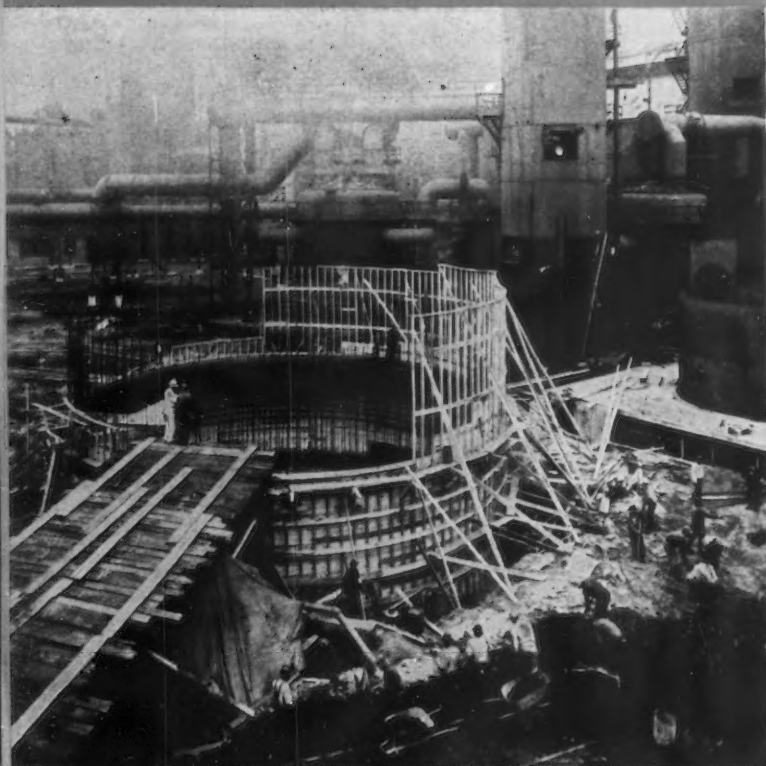
In determining maximum retail prices, a dealer takes the manufacturers' list price for the make and model in question and adds: (a) Federal excise tax; (b) an allowance for transportation which cannot exceed the actual rail freight

(CONTINUED ON PAGE 122)

McKee *again* increases iron and steel



Dismantling existing furnace in preparation for reconstruction.

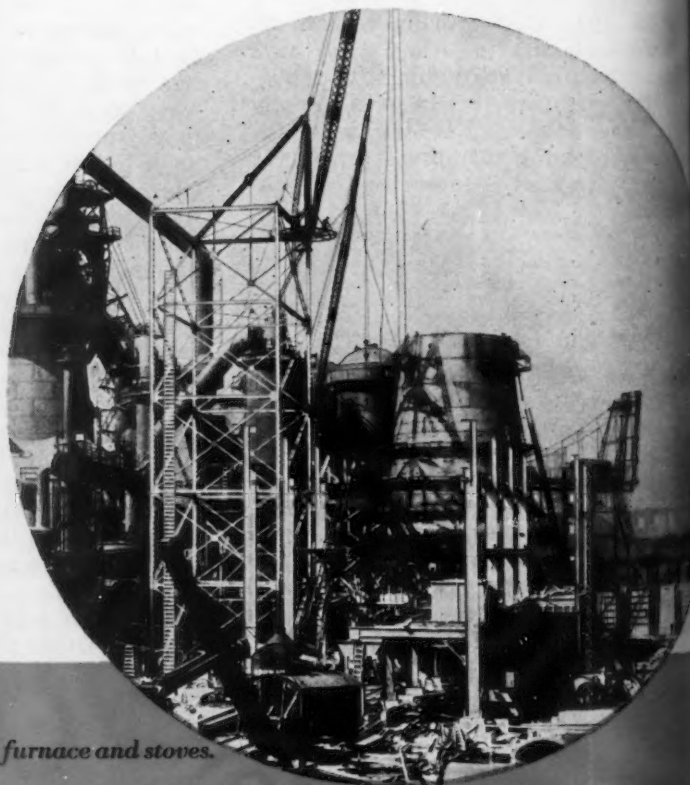


Building furnace foundation and beginning of stove construction.

WAR has now imposed on the Iron and Steel Industry new and greater demands than ever before for material for guns, ships, tanks and other armaments.

To produce the enormous quantities of steel needed, iron and steel companies throughout the United States and Canada have increased and are still increasing plant capacities. Side by side with them, Arthur G. McKee & Company are playing a major role in providing the vast, new production facilities which now form the very base of the nation's war effort.

Shown in various stages of construction in the accompanying photographs is another blast furnace recently completed by the McKee organization. This is one of many projects completed by McKee during the defense program to insure an increased and uninterrupted production of iron and steel to fight America's battles.



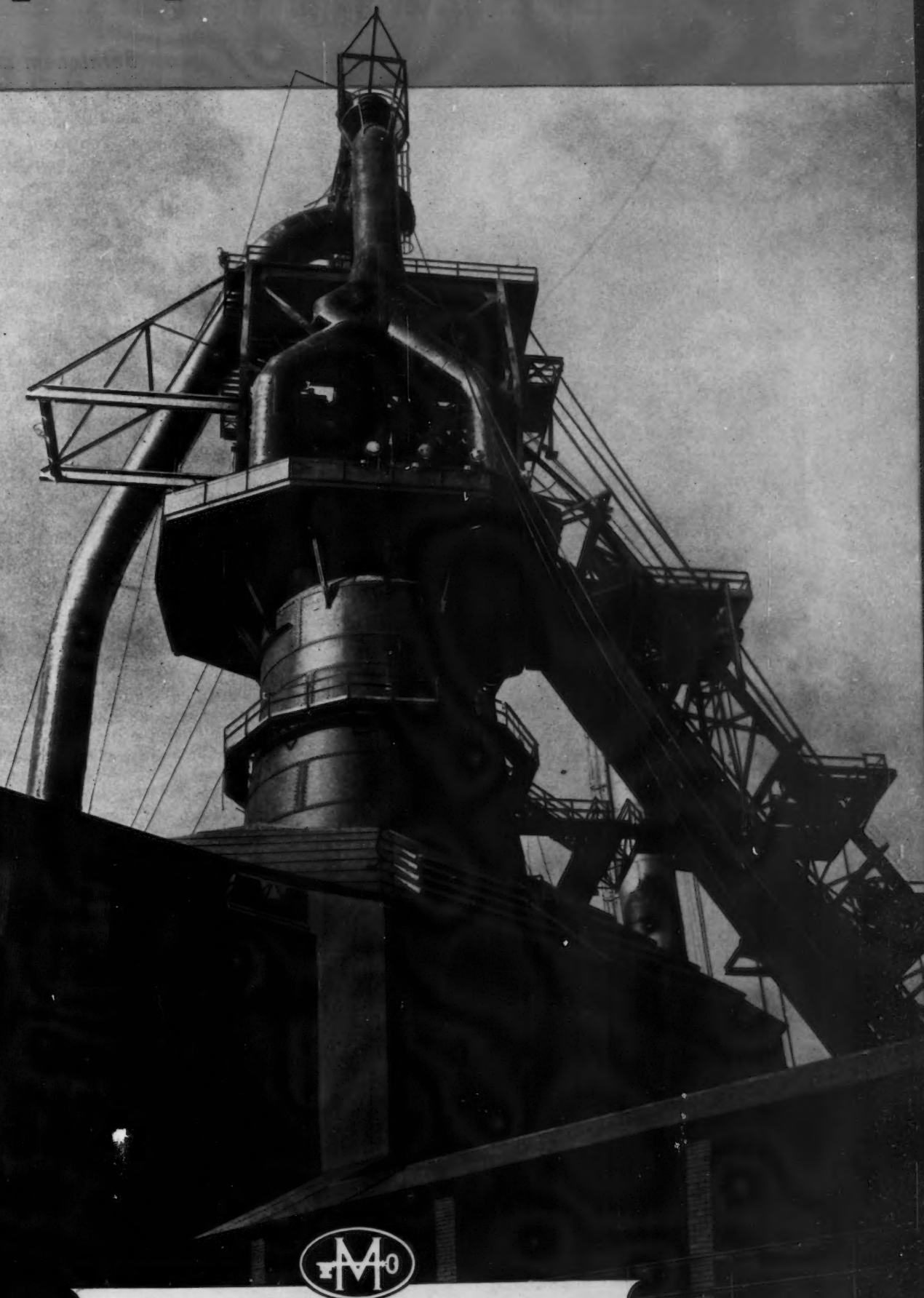
Erecting furnace and stoves.

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Arthur G. McKee & Company

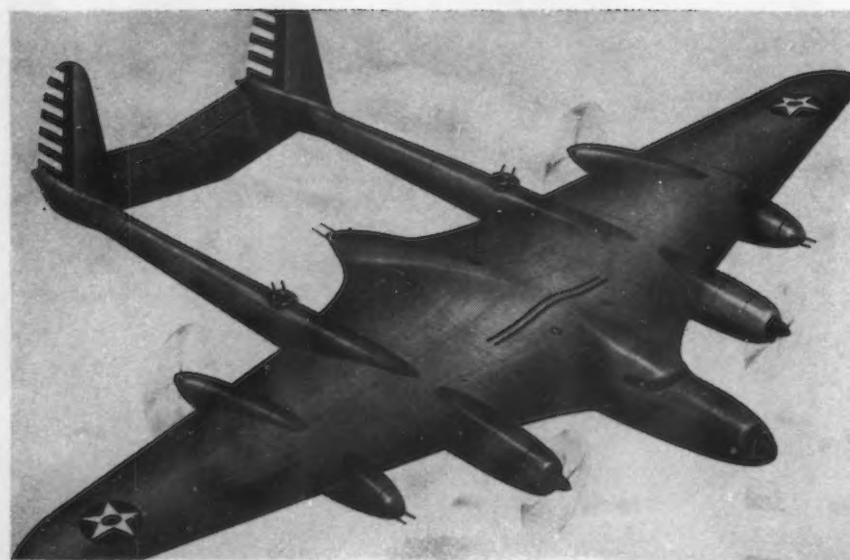
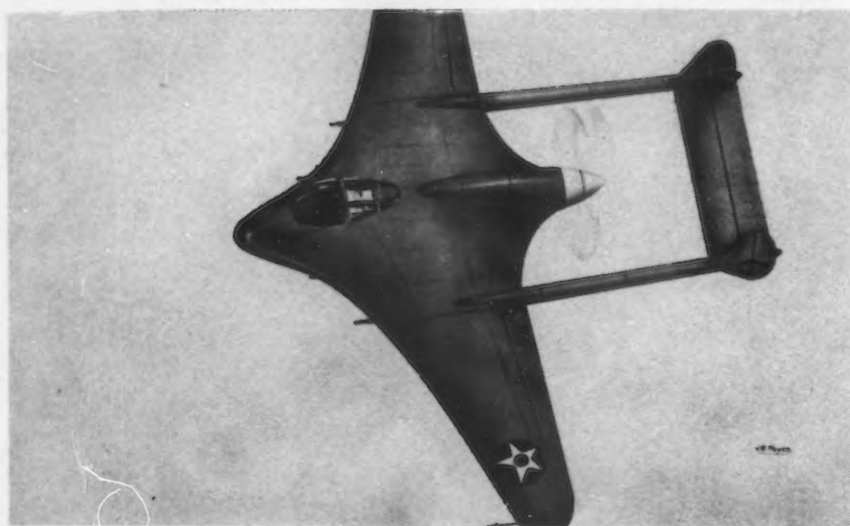
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ROCKEFELLER PLAZA
NEW YORK, N. Y.

Completing construction of furnace.

COMMERCE BUILDING
HOUSTON, TEXAS



PLANES OF THE FUTURE: Revolutionary experimental designs for fighting aircraft are envisioned here by U. S. Army artists. Top is a pusher type fighter, dubbed the "Canard" that flies tail first, giving the advantage of better vision and smoother operation in rough air. The "Bat" design of the center plane has advantages of an enlarged section wing and thin characteristics that reduce wind resistance. The heavy bomber, pictured below, has both pusher and puller propellers, is exceedingly heavily armed for self-protection, and armament is arranged for a wide-range of heavy fire-power. These designs do not mean planes will be produced in similar patterns, but they serve as a basis for the study of aerodynamics, fire-power, and performance, from which future American military planes will evolve.

AP Photos

Bethlehem Expanding Shipbuilding Facilities

••• With more than \$1,000,000,000 worth of shipbuilding orders now on their books, the Bethlehem Steel Corp. and its subsidiary shipbuilding companies are looking forward to the greatest year in history. Shipbuilding and repair facilities are being expanded with all possible speed. From a total of 20 ways during the summer of 1940, construction facilities were expanded to 56 ways at the end of 1941, and will total 76 ways by the end of the current year.

During 1941, Bethlehem produced about one-third of all sizable merchant ships delivered, and during the current year will deliver at the rate of two ships a week, averaging over 10,000 tons per ship.

An example of the speed-up in building ships for the merchant marine was pointed out with the Bethlehem Fairfield Plant, where the Victory cargo ships are under construction. The ship yard was authorized for construction in March, 1941, the first keel was laid on April 1, and the first ship was launched on Dec. 1, 1941. The yard is now launching ships at the rate of more than one a week, with 64 scheduled for delivery for 1942 and 95 in 1943.

Three new yards have been authorized, one for the exclusive construction of naval vessels. This yard is expected to deliver five ships a month, with the first being launched in April of 1943. Naval vessels on order before the 11 and 70 per cent naval construction increase programs are being delivered from 6 to 14 months ahead of schedule, and ships being built for the 11 and 70 per cent naval programs have been advanced at least 20 per cent ahead of schedule.

Consumers Must Absorb Freight Boost, OPA Rules

Washington

••• In anticipation of the forthcoming ICC decision in the so-called 10 per cent freight rate increase case, OPA has decided that any boost allowed in iron and steel scrap rates will have to be absorbed by consumers. The early action by OPA is to prevent disagreements which might slow down the scrap movement.

Decline Predicted In Pipe Tonnages

Pittsburgh

• • • Overall tonnages of oil-country tubing and casing are expected to decline in the coming months, not only because this material must have a definite priority rating before being produced but also because of a combination of factors including diversion of semi-finished material to plates and bars, substantial expansion in the United States government demolition bomb program, and a considerable pickup in lend-lease demand for casing, line pipe, and other tubular products.

Some sources have heard figures involving as much as 1,000,000 tons or more of seamless tube pipe for the manufacture of demolition bombs. With an increase in the manufacture of large bombing planes, it is expected that a corresponding or even greater program is materializing simultaneously for small, medium, and large aerial bombs, many of which require seamless tubing.

The WPB conservation order covering oil and gas materials which include casing, drill pipe and line pipe, has presented a problem to large oil producing companies. Many of the latter have a large backlog of orders on steel mill books which must be rechecked thoroughly in the near future. Already some companies have suspended some orders on the books and will replace them with new ones.

It is already apparent that some oil companies will not be issuing new orders for pipe for some time owing to backlog commitments as well as to stocks on hand at oil producers, plants or depots.

The major effect of the present tightening in the production and sales of oil-country goods will be to expand the releasing of steel for other uses such as ships and munitions and also provide facilities as well as material for the exceedingly heavy tonnage of pipe required for new army and navy bases, munition factories, bomb manufacture, and increased lend-lease requirements. Several thousand tons of the latter are understood to be in the active stage for Russian consumption.

IT CAN HAPPEN HERE!



Be Prepared for Air Raids

WITH **Carey** BLACKOUT PRODUCTS

These Scientifically Developed Products
Provide Maximum Protection to
Property and Personnel

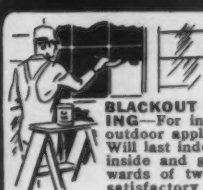
A blackout, to be fully effective, must guard against two definite conditions—prevent reflection of outside light—provide protection against flying glass. Carey Blackout Products ideally meet both of these requirements.

Civilian Defense Bulletin says: "A factory may be well blacked out, but its glass windows may reflect the light of moon, stars, fires or flares." The practical answer to this problem is to apply Carey Blackout Coating to outside surfaces of all skylights. This coating is non-reflective and insures complete light stoppage with one coat.

Civilian Defense Bulletin says further: "More injuries from flying glass are to be expected than from bombs or bomb fragments." Guard against this danger by applying any one of the three types of Carey Blackout Board to the inside of windows. Boards are rigid; cut to size; easily installed; quickly removable.

Carey Blackout Products are economical and effective because they are specifically designed for blackout use. Proved right by tests. Write today for prices and details. Address Dept. 26.

THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
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Office and Factory: LENOXVILLE, P. Q.



BLACKOUT COATING—For indoor or outdoor application. Will last indefinitely inside and give upwards of two years satisfactory service outside. Inexpensive; easily applied with large brush, or may be sprayed on; quick drying. Covering capacity 350-400 sq. ft. per gallon. Easily washed off with naphtha, benzol or other solvents.



BLACKOUT BOARDS—Laminated asphaltic boards of good rigidity for removable panel installation. Moisture and condensation proof. Boards are easily cut to shape and size.

ALL-PURPOSE TREATMENT—Where a more permanent, weather proof, or exterior treatment is desired, use the Carey Laminated System. Apply a thick film of



Careyclad Coating and embed 30-lb. Carey Feltex (or Carey Asphalt Saturated fabric membrane) topping with a finish of Careyclad Coating. This provides complete Blackout and renders the glass shatter-proof.

BLACKOUT PAPER—Always keep several rolls of Carey Blackout Paper on hand for quick, temporary repairs. For best results, use a light weight Carey Smooth



Roll Roofing or the less expensive Carey No. 7 FibreWave, a tough asphalt saturated and coated building paper, weighing only 10 lbs. per 100 sq. ft.

REJUVO SYSTEM OF CAMOUFLAGE—During the past year, we have been working with the U. S. Engineers in developing the Rejuvo System for camouflage purposes and a number of trial installations have been made. This special material and equipment for its application are available through the Carey Branch Office organization.



WPB at Detroit Seeks Sub-Contracting Help

Detroit

• • • A list of specific jobs upon which sub-contracting assistance is immediately desired has been released by the Detroit office of the Contract Distribution Branch, WPB. This branch has on exhibit heavy duty transmission parts totaling 37 in number, and consisting of spur gears, helical gears,

herringbone gears, spline shafts, counter shafts, bearing covers, yoke bars and shifting yokes.

Open capacity on No. 615A or No. 715A Fellows gear shapers or heavy duty hobbing machines is being sought.

In addition, subcontracting sources are sought for more than 20 parts for the medium M4 tank. Most of these consist of armor steel castings which will be supplied.

Priority Sought for 918-Mile Gas Line

Milwaukee

• • • Wisconsin Gas Transmission Co. is seeking priorities to build a 918 mile, 22 in. natural gas pipe line. Line would extend from the Texas Panhandle to a number of Wisconsin cities in the Greater Milwaukee area. It is contended that Milwaukee will have a gas shortage during the war emergency; and the company cites figures of 38,324,000 cu. ft. consumed during three peak days of a recent cold wave, while the plant's normal capacity was only 35 million cu. ft. Even if steel could be obtained for the line, there is no assurance that it could be constructed by next winter when the load is expected to be even heavier.

Illinois Small Business

Clearing House Grows Fast

Chicago

• • • Materials Clearing House of the Illinois division of the National Small Business Men's Association is growing rapidly. In its first month, December, more than \$150,000 worth of items was listed. In January, more than \$750,000 worth of goods was sold or exchanged. The clearing house operates simply, those firms having surplus items to sell, and those with needs to be filled list them with the clearing house, which then brings the parties together.

Atlantic Coast Line

Orders 1100 Box Cars

Birmingham

• • • The Atlantic Coast Line Railroad Co. has placed an order for 1100 40-ft. 6-in. box cars with Pullman-Standard Car Mfg. Co. The cars are to be built at Pullman's Bessemer, Ala., plant.

Caterpillar Runs 24-hr. Day

Peoria, Ill.

• • • Caterpillar Tractor Co. is now working 24 hours daily, at least six days a week. The schedule affects about 15,000 employees. Normal shifts are worked on Saturdays, and Sunday overtime is expected to be increased.

WHEN HEAVY LOADS CAUSE Machine Tool Chatter or Hot Bearings and Gears

USE "STURACO" MACHINERY OILS & GREASES

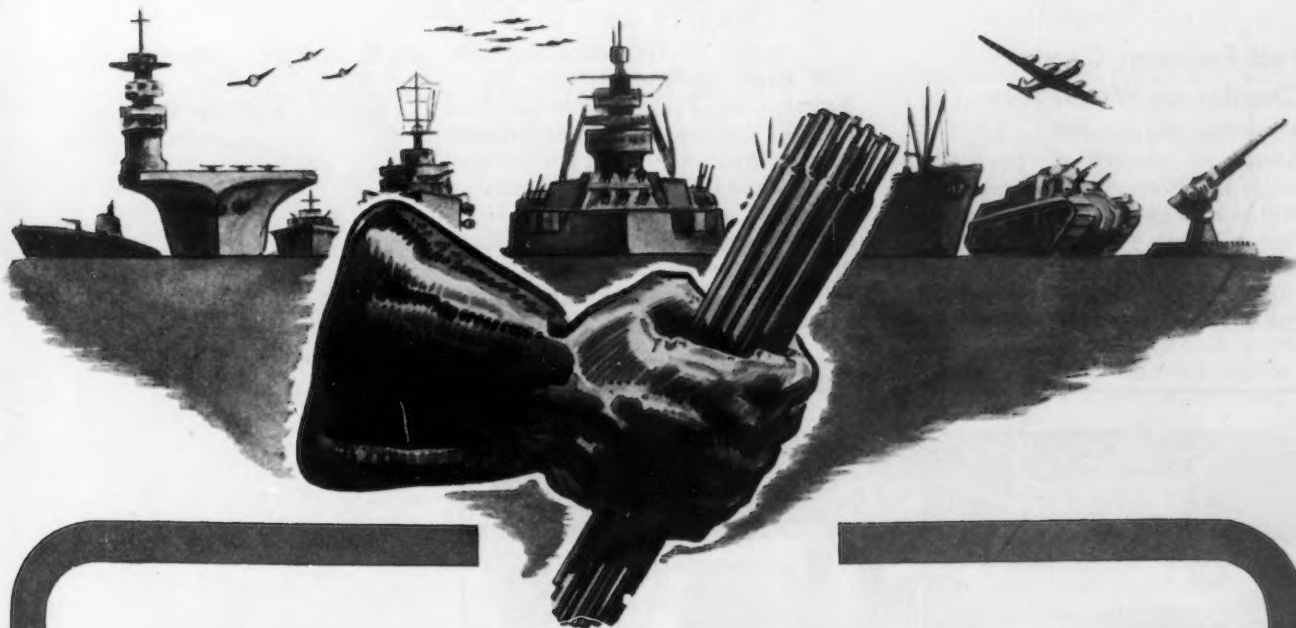
• Here is the answer to many of your lubrication problems caused by today's production demand of heavy loads, high speeds, and continuous operation of machinery and machine tools. "Sturaco" EP Oils and Greases, without any change in your accustomed viscosity or consistency, offer a minimum of 300% increased load carrying capacity with notable low torque.

Lubrication of ways — spindle bearings — gear heads — elevating screws — speed reducers — are typical examples where "Sturaco" application has solved tough lubrication problems. If you need help, write or phone today.

SEND FOR the new "Sturaco" booklet outlining laboratory research behind this genuine development, describing typical applications and listing various grades.



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D. A. STUART OIL CO.
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MAILED FIST!

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"QUALITY WELD METAL EASILY DEPOSITED"

Distributors Warehouse Stocks in the Following Cities:

ATLANTA, GA.	J. M. Tull Metal & Supply Co.	KINGSPORT, TENN.	Slip-Not Bolting Corp.
BUFFALO, N. Y.	Root, Neal & Co.	LOS ANGELES, CALIF.	Ducommun Metals & Supply Co.
BORGER, TEXAS	Hart Industrial Supply Co.	MILWAUKEE, WIS.	Machinery & Welder Corp.
BOSTON, MASS. (Belmont)	H. Boker & Co., Inc.; W. E. Fluke	MOLINE, ILL.	Machinery & Welder Corp.
CHICAGO, ILL.	Machinery & Welder Corp.	NEW YORK, N. Y.	H. Boker & Co., Inc.
CINCINNATI, OHIO	Williams & Co., Inc.	OKLAHOMA CITY, OKLA.	Hart Industrial Supply Co.
CLEVELAND, OHIO	Williams & Co., Inc.	PAMPA, TEXAS	Hart Industrial Supply Co.
COLUMBUS, OHIO	Williams & Co., Inc.	PITTSBURGH, PA.	Williams & Co., Inc.
DETROIT, MICHIGAN	C. E. Phillips & Co., Inc.	PORTLAND, OREGON	Industrial Specialties Co.
ERIE, PENNA.	Boyd Welding Co.	ROCHESTER, N. Y.	Welding Supply Co.
FT. WAYNE, IND.	Wayne Welding Supply Co., Inc.	SAN FRANCISCO, CALIF.	Ducommun Metals & Supply Co.
HONOLULU, HAWAII	Hawaiian Gas Products, Ltd.	SEATTLE, WASH.	H. A. Cheever Co.
HOUSTON, TEXAS	Champion Rivet Co. of Texas	ST. LOUIS, MO.	Machinery & Welder Corp.
KANSAS CITY, MO.	Welders Supply & Repair Co.	SYRACUSE, N. Y.	Welding Supply Co.
		TOLEDO, OHIO	Williams & Co., Inc.

Tool Engineers Charter Chapter at Washington

••• The Potomac chapter of the American Society of Tool Engineers has been chartered at Washington and another chapter at Williamsport, Pa., will soon be chartered. The chapter at the national capital is the 48th on the rolls of the A.S.T.E.

Raymond C. Harbst, chief tool and gage designer of the U. S. Naval Gun Factory was elected chapter chairman. Other officers named include: First vice-chairman, Ernest M. Seifert, master mechanic, assembly division, U. S. Naval Torpedo Station, Alexandria, Va.; second vice-chairman, Harold P. Berry, U. S. Naval Gun Factory, Washington.

Pre-Cast Bearing
Bronze on Steel

by **JOHNSON BRONZE**



The Strength of STEEL
The Bearing Qualities of BRONZE



Write for this
folder that fully describes this new and unusual bearing. It's FREE.

Pre-Cast Bearing BRONZE ON STEEL was developed to meet the present day bearing requirements of manufacturers in every type of industry. It enables you to increase speeds and loads . . . to gain longer life and smoother operation . . . plus greater resistance to shock and to wear.

Pre-Cast Bearing BRONZE ON STEEL is a thin wall, laminated type of bearing. A high quality bronze alloy is permanently bonded to strip steel. The fabricating process, a series of stamping and forming operations, provides a low unit cost with accuracy and precision.

While *Pre-Cast Bearing BRONZE ON STEEL* was developed primarily for sleeve bearings, it has found many other important applications in industry. It is an ideal metal for stampings, washers or other flat pieces. Available either in rolls . . . up to 400 feet in length . . . or as finished parts, made to your specifications.

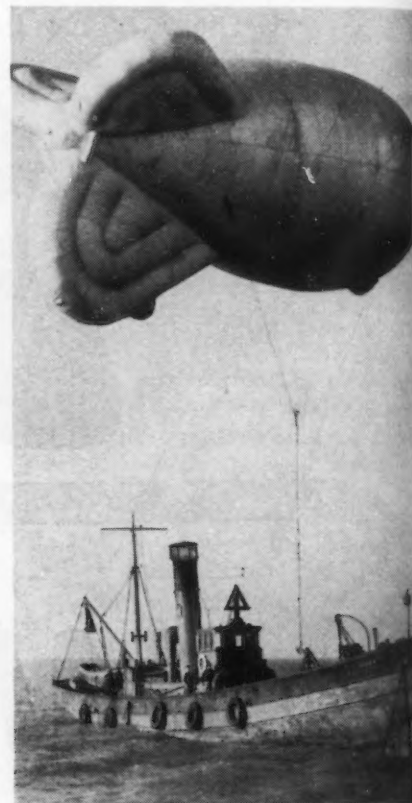
Investigate the possibilities of *Pre-Cast Bearing BRONZE ON STEEL* in your product. Complete information—FREE.



JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

505 S. MILL STREET • NEW CASTLE, PA.



British-Combine Photo

BARRAGE BALLOONS: London's river barrage balloon units come fitted with barges for handling. The barges, completely fitted with personnel living quarters, operate from a main operational barge. Here, a balloon is being hauled down to be refilled with gas.

Concrete Bar Industry Praised by Army, Navy

••• Army and Navy authorities are reported to be pleased with the part in the war effort being played by the concrete bar industry. In no case, it is said, have war plants or war reconstruction been held up due to lack of material. Non-rated concrete reinforcing business is unheard of and tonnages carrying less than an A-3 rating have little chance of even being considered. It is noteworthy, too, that reports indicate a complete disappearance of "gouging" in the form of high prices for fabricated reinforcing bars. Within the past week approximately 27,000 tons of concrete bars were awarded, the majority of which involved the construction of Army and Navy air bases and war factories. Unplaced tonnage involving projects of 500 tons or more early this week amounted to approximately 200,000 tons.

Henderson Given Power To Ration All Retail Goods

Washington

••• Formal authority to ration all goods and commodities sold on the retail markets was granted to the Office of Price Administration last week by Donald M. Nelson, chairman of WPB.

Conceding that this step was taken in anticipation of further extension of government control over retail, as well as wholesale business, WPB gave Leon Henderson, the price administrator, full power to establish the method of rationing as well as authority to enforce the rationing orders.

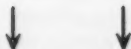
Thus far rationing of retail goods, as tires, tubes, sugar, etc., has been a stepchild, with actual responsibility for the administration of the effort not quite clear. The new WPB order clearly gives that authority to OPA, although specifically stating that WPB reserves the right to amend this delegation of authority at any time.

Retailing is described in the order as (1) the sale of products by any person who sells at retail and, (2), the sale of products by any person to an ultimate consumer acquiring the products for the satisfaction of personal needs, as distinct from business or industrial needs.

The order is quite clear in that while OPA will administer retail rationing, allocation of materials and other supplies for war purposes will still remain the authority of WPB. OPA is specifically forbidden to control or ration purchases of material by the Army or Navy, Maritime Commission, Panama Canal, Coast and Geodetic Survey, Coast Guard, Civil Aeronautics Authority, National Advisory Commission for Aeronautics, Office of Scientific Research and Development, government agencies and other persons buying for export to foreign countries.

OPA is given authority in the order to regulate or prohibit the sale of items to any retailer who has violated any rationing order and to regulate or prohibit sales to any wholesaler or other supplier of any retailer if the wholesaler or supplier has violated a rationing order.

The quantity of material or products which can be made available to the retail market will be announced to OPA by WPB, the order states.



Small Plants Aided by New Production Requirements Plan

••• A simplified Production Requirements Plan for manufacturers whose annual volume of business is less than \$100,000 has been announced by the Division of Industry Operations of WPB.

The new plan, known as the Modified Production Requirements Plan, is designed to enable the small manufacturer engaged in war or essential civilian production more quickly and easily to obtain priority assistance to meet his needs for scarce materials over a calendar quarter.

Applications will be received immediately under the plan for the full three months period ending March 31. When assistance is granted, the quantities certified will be adjusted to those proper for the remainder of the quarter. At the same time, if desired, manufacturers may apply for their needs for the full quarter ending June 30. They may do this simply by filing a second application for that period along with the first one. Or, they may file this second application at a later date. Application blanks in a new form, PD-25-X, may be obtained from the Small Business Section of the Production Requirements Branch, War Production Board, in Washington, or from the Branch Offices of the War Production Board located in principal cities throughout the country.

A small manufacturer in applying for priority assistance under this plan is required to fill out only a one-page blank. With the application blank, the manufacturer will be furnished a list of raw materials called Materials List No. 2. This is designed to

help him in describing and properly reporting the quantities of the various materials he uses and needs to procure.

Form PD-25-X on which this information is to be entered is much simpler and shorter than the Form PD-25A which is used by larger manufacturers under the original Production Requirements Plan. If a manufacturer is unable to supply all of the information indicated by the application form, he may nevertheless submit his application with such information as he can furnish and the application will be given full consideration.

An added and important feature of the plan is the opportunity it gives an applicant to report the power-driven equipment and machinery in his plant. A copy of

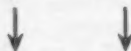
J. S. Knowlson, director of Industry Operations of WPB, last week issued an order known as Priorities Regulation No. 4, formally validating all preference rating certificates issued by OPM and still active.

the application containing this information will be given to the Division of Industry Operations, which will thus be in a position to take such steps as may be possible to employ the equipment for war production. This feature is expected to bring to light a great deal of machinery in small plants throughout the United States which can be used on war orders, but which has not yet been brought into the war program.

Each applicant under the modified plan must fill out five copies of form PD-25-X, retaining one copy and sending the other four to the Small Business Section, Production Requirements Branch, WPB, Washington. If the priority rating is granted, a certified copy of the application will be returned to the manufacturer. These priority ratings are used by simply writing a prescribed endorsement on the purchase order. They may be extended to suppliers and sub-suppliers for materials which are to be physically incorporated in the applicant's product.

A manufacturer which operates under this plan may not use any other preference ratings, other than those specifically assigned,

except when he uses the A-10 rating assigned by order P-100.



Form PD-1a Now in Use

• • • Beginning Feb. 2, applications for individual preference ratings can be filed on the new PD-1A application blanks in accordance with Priorities Regulation No. 3 which was issued on Jan. 12. Preference ratings assigned on Army and Navy contracts may now be issued on Form PD-3A.

The most important feature of Priorities Regulation No. 3 is that ratings assigned on PD-1A and PD-3A forms may be extended to suppliers and sub-suppliers by a simple endorsement on purchase orders. Heretofore, ratings assigned in response to applications on the old PD-1 forms have not been extendable under any circumstances, and ratings assigned to Army and Navy orders on PD-3 forms could be extended only if the extension were countersigned by an authorized government officer when the amount involved was more than \$500.

Because of the tremendous printing job involved, PD-1A forms will not be available in quantity until about the middle of the month. However, the forms may be reproduced by anyone if the reproduction is exactly like the official form as it will be is-

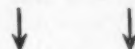
sued Feb. 2. Reproductions made from earlier versions of the form which were prepared by OPM will not be valid.

When PD-1A forms are not available, applications may still be filed on PD-1 forms until March 2. However, ratings which have been assigned or which are hereafter assigned on PD-1 forms cannot be extended.

When an individually rated order is served upon a supplier by the original applicant under the new procedure, the rating may be extended by the supplier, by his suppliers and sub-suppliers to obtain any material which will be delivered to the original applicant in accordance with the rating, but neither the applicant, his suppliers or sub-suppliers may use the rating to obtain machinery or capital equipment which they use in fabricating parts to fill the order. If producers who have been assigned a rating on a PD-1A form need machinery or capital equipment for this purpose which they cannot obtain without priority assistance, they must apply for a separate preference rating on another PD-1A form. Prime contractors who need machinery or equipment to be used exclusively in filling Army or Navy orders may be given a rating for use in obtaining such machinery or equipment on PD-3A forms.

The new regulation also allows a supplier or sub-supplier who has

received two or more purchase orders bearing ratings of the same grade to include in a single purchase order or "basket," within the limitations which have been indicated above, any or all of the material which he requires to make deliveries in accordance with the rated purchase orders which have been served upon him.



Aluminum Use Permitted

• • • Aluminum may be used in the items listed below, according to the terms of order M-1-e issued last week (see THE IRON AGE, Jan. 29, p. 92). The order stresses that aluminum may be used in these products only when the use of an alternate material is impracticable.

Anhydrous aluminum chloride: provided, that the customer certifies in writing to the manufacturer that such chloride will be used in the production of dyes for defense textiles, or in the production of high-octane gasoline, tear gas, nylon, or pharmaceuticals. Only low-grade aluminum which has not been debased shall be used for this purpose.

Chemical processing equipment for use in manufacturing plants: provided, that the customer certifies in writing to the manufacturer that chemical action makes the use of other material impracticable.

Commercial aircraft: provided that the customer certifies to the manufacturer that such aircraft are being produced in the fulfillment of orders bearing A-10 or higher priority ratings.

Containers for intravenous solutions and blood.

Fired electrolytic and paper condensers, excluding cans: provided that the customer certifies in writing to the manufacturer that such condensers will not be used in new radio receiving sets. They may be used to replace defective condensers in existing radio receiving sets.

Match plates, patterns and snap flasks: provided, that the customer certifies in writing to the manufacturer that they will be used as an aid to manufacture where light weight and strength are essential in production in the fulfillment of orders bearing A-1 or higher pri-

JERSEY PARATROOPS: Wearing cold-resistant uniforms, Marine Corps paratroops board a transport plane in New Jersey for the final jump in a required series of six, which marks completion of a 6-weeks' course. These men are volunteers.

Photo by International



ority ratings. Only low-grade aluminum which has not been debased shall be used for this purpose.

Orthopedic equipment: provided, that light weight is vital to the operation of the equipment.

Pistons for engines of trucks (1½ tons or over), heavy duty tractors, diesel engines, and engines in portable fire-fighting equipment. Only low-grade aluminum which has not been debased shall be used for this purpose.

Repair and maintenance parts for mechanical or electrical equipment used domestically or in industry: provided, that the manufacturer certifies in writing to WPB, that parts made of other material cannot be used and that an equivalent weight of similar defective aluminum parts has been returned by the ultimate consumer and disposed of as provided in order M-1-d. Only low-grade aluminum which has not been debased shall be used for this purpose.

Welding rods

X-ray Tube Housings

Steel industry. Aluminum may be used as a de-oxidizer or alloying agent in the manufacture of steel. The total amount so used during any month shall not exceed 0.03 of 1 per cent by weight of the amount of carbon steel, and 0.1 of 1 per cent by weight of the amount of alloy steel, produced during such month. Also, the amount used in deep drawing steel shall in no case exceed 0.1 of 1 per cent by weight of any such steel produced. Only low-grade aluminum which has not been debased may be used for de-oxidizing purposes.

Thermit reaction. Aluminum may be used in the manufacture of thermit powders and ferroalloys where and to the extent that the use of any other material is not possible.

Manufacture of zinc base alloy. Aluminum may be used in the manufacture of zinc base alloy but only to the extent of 2 per cent by weight of the amount of zinc base alloy produced during any month. Only low-grade aluminum which has not been debased may be used for this purpose.

Manufacture of other alloys. Aluminum may be used in the manufacture of other alloys, but the amount so used in any month shall not exceed 12 per cent by

weight of the amount of such alloys produced during such month. Only low-grade aluminum which has not been debased may be used for this purpose.

Prohibitions and restrictions do not apply to the use of aluminum in the manufacture of any item (or the necessary material) which is being produced under a specific contract or subcontract for the Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, Coast Guard, Civil Aeronautics Authority, National Advisory Committee for Aeronautics, the Office of Scientific Research and Development, or any foreign country under the Lend-Lease Act.

Bookbinders' Wire Covered

••• WPB has granted an A-8 preference rating for delivery of materials for the manufacture of stitching and bookbinders' wire, essential to the printing and publishing industry, in order P-1010.

Producers are entitled to apply the rating to obtain delivery of the steel rods necessary to make stitching wire. The rating can be applied only for materials authorized on Form PD-82. WPB will determine these requirements on a quarterly basis, and it is expected that for the first quarter, a reduction of from 10 to 12 per cent from normal current usage of steel will be required.

Chemical Plants Get Rating

••• WPB's Division of Industry Operations has announced that the war chemical industry is to receive the assistance of high priority ratings in securing necessary repair, maintenance and operating supplies.

Preference rating order P-89 issued early this week assigns an A-1-a rating to deliveries of materials to repair actual breakdowns; A-1-c to materials required to avert immediately threatened stoppages, and A-3 to the procurement of materials for other repairs, maintenance and operation.

Neither the A-1-a nor the A-1-c rating may be used to replace material withdrawn from inventories, and the A-3 rating cannot be used

for that purpose if, at current rates of consumption, further deliveries would increase inventories above the stipulated minimum. Prior authority, which may be obtained telegraphically, is required before application of the breakdown ratings.

Mercury Use Restricted

••• Mercury usage is sharply curtailed by conservation order M-78, issued by WPB. The order provides that after Jan. 15 no person shall use mercury in the manufacture of any item or process on List "A" of the order in excess of 50 per cent of his requirements during a given base period and that after March 31 he will entirely stop using mercury for such purposes.

List "B" of the order contains articles whose manufacture may be continued at 100 per cent, and in one case at 125 per cent, of the rate during the first quarter of 1940 or the first quarter of 1941, at the option of the manufacturer. These items include fluorescent lamps, health supplies, industrial and scientific thermometers, and mercuric fulminate for ammunition and blasting caps.

Alcohol Order Amended

••• Regulations governing receipts and shipments of ethyl alcohol and related compounds, brought under control by general preference order M-30, are revised under the terms of Amendment No. 3 to the original order.

Principal points of the amendment are: (1) Definition of ethyl alcohol is changed to indicate that alcohol for industrial purposes only is comprehended. Proprietary solvent is included in the definition of this term; (2) Restrictions on receipts will henceforth be by calendar quarterly periods, rather than by monthly periods. Restrictions on producer's deliveries, previously contained in the order, are rescinded; (3) Certain orders, including those with an A-1-j or higher rating, may be filled without reference to quantity limitations. Quantities delivered under these orders shall be in addition to the restricted quantities permissible.

This Week's Priorities and Prices

Production Requirements Plan simplified to aid manufacturers whose business volume is less than \$100,000 annually. New plan becomes operative immediately and calls for use of Form PD-25-x. (WPB-49)

Rationing of all retail goods and products sold to ultimate consumers for personal needs centered in office in OPA by directive issued by WPB Jan. 24. (WPB-53)

Titanium oxide emergency pool raised to 25 per cent from 20 per cent, effective Feb. 1, in amendment No. 3 to Order M-44 issued Jan. 24. (WPB-58)

Nickel, brass and copper use in incandescent lamps curtailed in limitation Order L-28 issued Jan. 24. (WPB-57)

Brass use in shoe eyelets restricted by supplement No. 1 to Order M-9-c issued Jan. 23. (WPB-43)

Slab zinc placed under a formal price ceiling in schedule No. 81, effective Jan. 29. (OPA-PM2354)

Aluminum use further restricted by Order M-1-e issued Jan. 23. Covers both primary and low grade as well as anhydrous aluminum chloride. (WPB-42)

Dry felt manufacturers discussed (Feb. 2) with OPA advisability of establishing maximum or voluntary agreements on prices. (OPA-PM2319)

Air raid shelter construction will not be given priority assistance, according to an announcement issued Jan. 25. (WPB-25)

Stitching and bookbinder wire manufacturers assigned rating of A-3 for scarce materials in Order P-101 issued Jan. 24. (WPB-59)

Diphenylamine placed under complete allocation on Feb. 1 by Order M-75. (WPB-87)

Order P-90 amended to permit producers to extend AA ratings without special permission of WPB. (WPB-75)

Preference rating certificates issued by old OPM formally validated by WPB in Priorities Regulation No. 4 issued Jan. 26. (WPB-48)

Forms PD-1a and PD-3a became active Feb. 2, replacing old PD-1, 2, 3, 4 and 5. Users warned against using sample form copies issued previous to Feb. 2. (WPB-81)

Open die steel forging makers requested to hold prices to levels of Oct. 10, 1941. (OPA-PM2333)

Borax price advance of \$1 a ton permitted; boric acid raised \$2. (OPA-PM2330)

Metallic lead product price ceiling revised to give producers alternate choices. (OPA-PM2334)

Paraffin wax price ceiling terms redefined on basis of price at sellers' shipping point. (OPA-PM2336)

Beehive coke prices placed under a ceiling in schedule No. 77 issued Jan. 27. (OPA-PM2323)

Oxalic price schedule, No. 78, issued Jan. 29. (OPA-PM2340)

Lithopone price ceiling schedule, No. 80, issued Jan. 29 and became effective Feb. 2. (OPA-PM2339)

Carbon tetrachloride placed under ceiling prices in schedule No. 79 issued Jan. 29 and became effective Feb. 2. (OPA-PM2338)

Farm implement makers requested to stabilize prices. (OPA-PM2335)

Gear manufacturers requested to hold prices to levels of Oct. 15, 1941. (OPA-PM2349)

Brass and bronze ingot prices stabilized, effective Feb. 1, by voluntary agreement. (OPA-PM2352)

Wire and cable price ceiling set in schedule No. 82 issued and effective Jan. 30. (OPA-PM2355)

Radio set and radio tube prices placed under a ceiling in schedules No. 83 and 84 issued Jan. 30. (OPA-PM2357)

Second hand machine tool sales to be more closely controlled, according to order E-4 issued Feb. 3. (SPB-112)

Preference rating applications for privately financed dwellings under order P-71 may be filed up to Feb. 14, instead of Feb. 1 as previously set. (WPB-97)

Zinc pool requirements for February increased to 40 per cent and zinc oxide boosted to 20 per cent in order M-11-h. (WPB-111)

Suspension order S-1 modified to permit certain operations at foundry affected by order. (WPB-114)

Order P-45, covering fire apparatus, extended to Feb. 28, 1942. (WPB-98)

• • •

For copies of above announcements address defense agency concerned at Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB:100 means announcement 100 issued by the War Production Board.)

Revisions for The Iron Age Priorities Guide

• • • Following revisions are to be made to THE IRON AGE Priorities and Allocation Guide published with the issue of Jan. 29. These items should be suitably cross-indexed.

Under "M Orders," page 8, add:

- M-1-e—Further restricts aluminum use; specifies where it may be used and gives conditions of use (1-23-42).
- M-9-c—Supplement No. 1. Restricts brass use for shoe eyelets; prohibits use in findings after March 31 (1-23-42). Related forms: PD-259, 260 and 261.
- M-44—Amendment No. 3 (2-1-42). Raises emergency pool to 25 per cent.
- M-54—Amendment No. 1 (1-23-42). Base periods of restrictions revised; certain restrictions relaxed.
- M-75—Diphenylamine placed under full allocation (1-30-42). Related forms: PD-262, 263, 266.
- M-78—Curtails use of mercury (1-23-42).
- M-82—Restricts use of hemp seed (1-23-42).

Under "L Orders," pages 7 and 8, add:

- L-28—Restricts production of incandescent lamps (1-24-42).

Under "P Orders," page 6, add:

- P-89—Maintenance, repairs and operating supplies for chemical industry (1-23-42). Related form: PD-81. Rating granted A-1-a to A-3.

- P-90—Amendment. Permits extension of AA ratings without special permission from WPB (1-30-42).

- P-101—Material for production of stitching and book-binding wire (1-24-42). Related forms PD-81, 82. Rating assigned; A-8.

Under "E Orders," page 7, add:

- E-4—Establishes controls over sales of second-hand machine tools.

Under "Miscellaneous Orders," page 7, add:

- Priorities Regulation No. 4. WPB validates preference certificates issued by OPM (1-26-42).

Under "Forms to Use," page 14, add:

- PD-259—Report to be filed by manufacturer of shoe findings containing copper, re. M-9-c, supplement No. 1 (original report).
- PD-260—Report to be filed before April 15 by manufacturer of shoe findings containing copper, re. M-9-c, supplement No. 1.
- PD-261—Appeal of shoe finding manufacturer for relief from terms of M-9-c, supplement No. 1.
- PD-262—Application for making or accepting delivery of diphenylamine; re. M-75.
- PD-263—Application to make delivery of diphenylamine; re. M-75.
- PD-266—Application to accept delivery of diphenylamine; re. M-75.

SCHEDULED FOR

REINCARNATION



FROM coast to coast in the nation's junk yards are tons and tons of scrap rubber destined for shipment back to the rubber factories. Here it will be cut and ground, melted and freed of sulphur and finally reincarnated into countless new rubber "mechanicals" vitally needed for war production. Essential to this processing of reclaimed rubber is the removal of all miscellaneous iron, a job ably performed in many plants by Dings High Intensity Magnetic Separators specially engineered to meet the requirements of the work.

This is just one of literally thousands of ways Dings research into magnetic separation is serving in the reclamation and conservation of strategic materials. In the metal industry, Dings Separators are removing iron from foundry sand, separating scrap, reclaiming metallics from slag, removing metal from cutting compounds; Dings Lifting Magnets are speeding up metal handling; Dings Clutches keep the mill stands jogging; Dings pipe rolls speed pipe from the spelter.

Write to Dings today for data on magnetic equipment for your job and ask for a copy of the new Magnetic Alchemy Bulletin.



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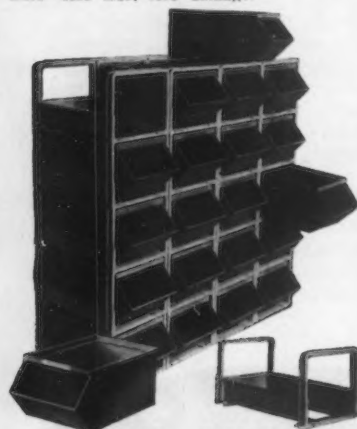
Is Slow Handling of Parts "Choking" Production?

Here's how the Stackbin System—made up of inexpensive, portable storage units—will speed up handling of parts and materials.

No stockroom tie-up! Parts can be located instantly without piling and unpiling boxes. Can be transferred from bin to tote pan and back again without a minute's loss. **No waste motions on assembly line!** Parts can be placed within easy reach of workers. Units can be erected under benches, near machines. The Stackbin System is speeding up handling of parts in aircraft plants—in most production-minded industries. Write for "LOWER COST STORAGE AND HANDLING". Stackbin Corp., 89 Troy St., Providence, R. I.

IDEAL STOCKROOM UNIT

is this combination of Stackbins-in-Stackracks. Parts and materials are transferred from one department to another, are used or processed and passed along in their storage container. No waste time—less loss, less damage.



STACKBINS

are individual hopper-fronted storage bins—with perfectly smooth interiors—which nest to form work units and slide in Stackracks like drawers for storage.

STACKRACKS

are individual racks of heavy steel—made in any size you need. Locking together without tools, they make a strong, rigid storage rack of any capacity, height or shape you want.

AS FLEXIBLE, EASY TO ASSEMBLE

as sectional book-cases, nested Stackbin sections provide temporary storage space wherever needed. Many modern plants use them as room or departmental storage "depots".



SLOPING FLOORS

permit Stackbin Assembly Bins to feed parts continuously towards the front of the bin. Tapered front design provides semi-circular set-up, so that all parts are within easy reach.



All units in the Stackbin System are constructed of heavy steel—welded for permanent rigidity.

STACKBIN

STACKED
AND



STILL
ACCESSIBLE

SYSTEM

STACKBIN CORPORATION
89 Troy St., Providence, R. I.

Engineers at Pittsburgh Will Hear Batt and Dyer Pittsburgh

••• William L. Batt, materials division, WPB, and president, SKF Industries, Inc., and Dr. G. W. Dyer, Vanderbilt University, Knoxville, Tenn., will be speakers at the annual banquet of the Engineers' Society of Western Pennsylvania to be held here Feb. 9. Dr. Edward Weidlein, consultant on chemicals and allied products, WPB, and director, Mellon Institute of Industrial Research, Pittsburgh, will be toastmaster.

Michigan Training Schools To Take Women, Older Men Detroit

••• Directors of vocational, educational and training programs in 53 Michigan cities have been told that they must intensify training of munitions workers and begin the training of women and older men for work in factories. They were also informed that they must begin to train at least twice as many persons as have already been trained under the Federal financed program. Edward Cushman, of the Federal employment service, said that Michigan would face a labor shortage in 1943, and proposed that private machine shops be rented for use in defense training.

Demand for Sheet Steel Substantial in South Birmingham

••• The amount of sheets obtainable by wholesale hardware companies in the Birmingham district is below quotas and far below demand.

Anticipating the scarcity of steel for civilian use, most distributors had laid in substantial stocks of farm and poultry fencing and these stocks, it is believed, will be sufficient to take care of requirements in this area during 1942.

Wholesale hardware dealers are having little success in obtaining bars in any considerable volume and nail purchases are being kept down to single kegs rather than carload lots.

Army Inaugurates Its Own Scrap Campaign Washington

••• The Army has instituted its own scrap saving campaign. Commanders of all posts have been ordered to transfer, under the provisions of Army regulations, to civilian channels salvaged obsolete armored vehicles, old cannon and solid shell (except for articles of historical or definite decorative value), unused railway siding rails, condemned trucks and other articles.

AIRPLANE HOSPITAL: Fighter plane "hospitals" where damaged aircraft are reconditioned or dismantled and used as replacement parts in other machines are part of the Ministry of Aircraft Production's efficient organization. A high percentage of otherwise "write-offs" are put back into service by this repair method.

British-Combine Photo

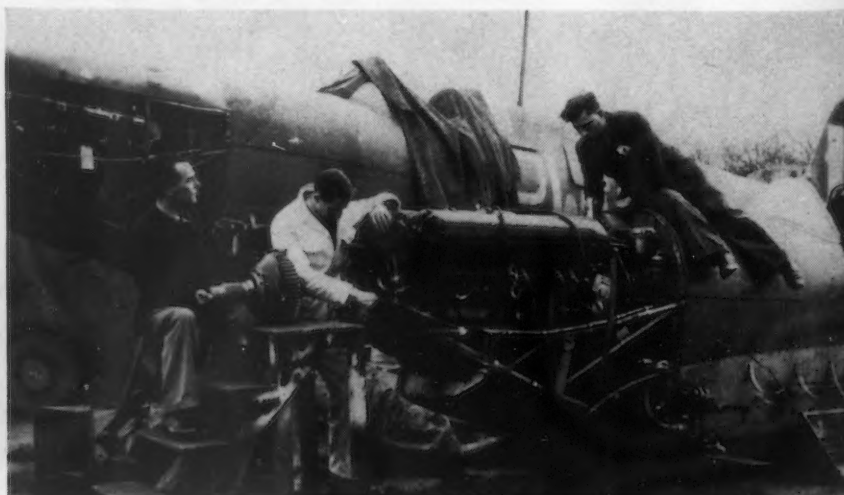




Photo by Acme

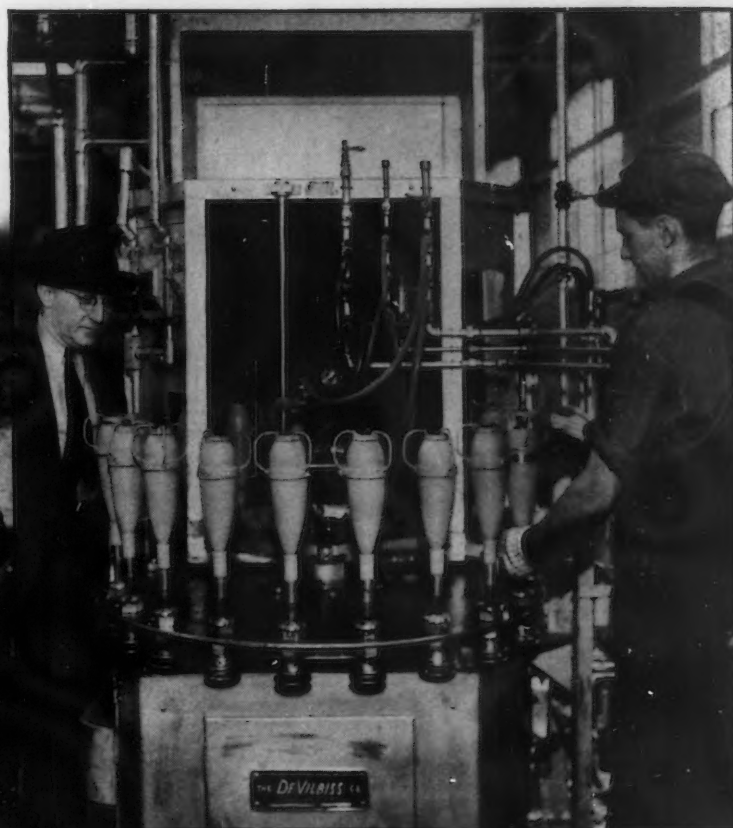


Photo by Tokheim Oil Tank and Pump Company

"Yes..." PAINTING 'EGGS' IS DEFENSE WORK"

● Painting eggs doesn't sound like a defense job. But "eggs" is Army lingo for the high-explosive ten pound bombs that are hurled from 3-inch trench mortars. Tokheim Oil Tank and Pump Company of Ft. Wayne, Indiana, is turning them out at the rate of many thousands a day, on British and U. S. Army orders.

Painting these "eggs" is an intricate and exacting task. And Tokheim, which for many years has used DeVilbiss Spray Equipment to give its well-known oil and gasoline pumps their attractive enamel finish, again relies on DeVilbiss for the answer.

It has installed three specially designed DeVilbiss Automatic Systems, one of which paints each bomb casing

THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials • Spray booths and exhaust fans for vapor and dust elimination • Air regulators, cleaners and dusters • Air compressors • Respirators • Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint strippers • Medicinal atomizers • Perfume atomizers.

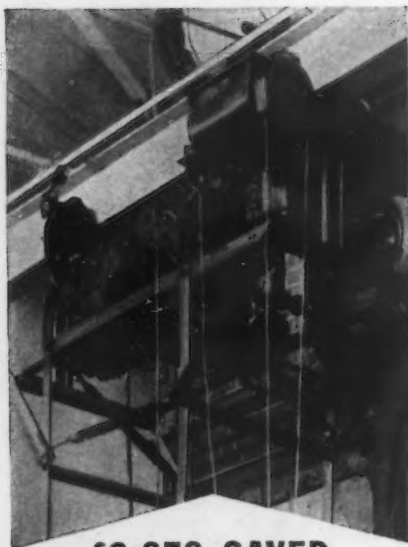
inside and out, while a second coats primer cup assemblies, and the third sprays tail fin units—keeping up with top speed continuous three-shifts-a-day production.

Tokheim's story is typical of the way modern DeVilbiss Equipment is helping industry to solve new finishing problems in the transition from peacetime output to defense manufacturing. Helping to make America the arsenal of democracy. If your company is taking any part in that tremendous job, DeVilbiss Spray Systems can aid you to do it faster and better.

THE DEVILBISS COMPANY • TOLEDO, OHIO
Canadian Plant: WINDSOR, ONTARIO

DEVILBISS SPRAY SYSTEMS





\$3,878 SAVED EVERY YEAR

AND STILL "GOING STRONG!"

And savings like that every year for twelve years don't just happen. They are engineered. But this manufacturer got even more advantages from letting Reading engineers solve his handling problem.

- Coal and ash handling was speeded, letting the engineer take care of the engine room, too. (The company saved money and the engineer made more.)
- Maintenance costs averaged less than 1% a year for twelve years.
- Fuel costs were cut by more even firing of the boiler.
- Less dust and dirt reduced the need for frequent boiler room cleaning and repaint jobs.

NOTE: This Reading installation did such a good job that it has been duplicated in several manufacturing plants.

Remember that when results and savings are in the specifications . . . it pays to rely on Reading's engineering ability.

READING CHAIN & BLOCK CORP.
DEPT. A-2, READING, PA.



READING

Chain Hoists, Electric Hoists,
Cranes and Monorails

New Truck, Repair Part Output Aided by Priorities

••• Authorization has been granted by WPB for the production of 54,710 medium and heavy trucks during March, 1942, as compared with 40,802 in the same month of last year, a 34 per cent increase, but it was ruled that the trucks could not be equipped with tires, casings or tubes. Tires and tubes may be used only to assist in delivering the vehicles to dealers after which they must be removed and returned to the producer. The effect of this order will be to create a stockpile of medium and heavy trucks for essential civilian uses.

In addition to permitting stepped-up output of medium and heavy trucks, WPB authorized unlimited production during March of passenger carriers and truck trailers. An A-3 preference rating is made available for delivery of materials going into the manufacture of these heavy-type vehicles, but the rating cannot be applied to deliveries of tires, casings or tubes to equip medium and heavy trucks. No restrictions are placed on production to fill certain government, foreign government and lend-lease orders.

Orders designed to facilitate production of spare parts for medium and heavy trucks, truck trailers, passenger carriers and school bus bodies were also issued.

Under limitation order L-35, producers may make during the first quarter of this year 60 per cent of the number of designated replacement parts sold by them for replacement purposes during the last half of 1941. Under Limited Preference Rating Order P-107, an A-3 rating is assigned to deliveries of materials going into the manufacture of these spare parts.

Seeking to hasten conversion of the automotive industry to war work, WPB has permitted sharp acceleration in production of spare parts for passenger cars and light trucks to form a stockpile for future needs.

Producers may make during the first half of this year up to 150 per cent of the number of each of the replacement parts sold by them for that purpose during the entire calendar year 1941. An A-10 preference rating is made available to producers and suppliers to obtain materials going into the manufacture of spare parts.

Iron Capacity Corrected

••• In an article entitled "83 Million Tons of Iron Ore is Goal for 1942," published in THE IRON AGE, Jan. 15, page 70, it was stated that 4,700,000 tons of additional pig iron capacity would be available on May 1 of the present year. This was incorrect. Pig iron capacity will not reach 4,700,000 tons until May 1, 1943.

BRITISH ENGINE PRODUCTION: These "Bristol Hercules" engines, for the Bristol Beaufighter and Short Stirling airplanes, are being turned out in great numbers by the British. The Beaufighter fights against enemy bombing attacks over England, and the Short Stirling carries loads of bombs over Germany and occupied territories for disposal.

British-Combine Photo





THE DUTY THAT WE OF THE SECOND LINE OF DEFENSE HAVE

TO PERFORM TO THE UTMOST LIMIT

IS

THE GREATEST POSSIBLE PRODUCTION OF VITAL MATERIALS,

THE ADEQUATE PURCHASE OF DEFENSE BONDS AND STAMPS,

THE NECESSARY SUPPORT OF THE AMERICAN RED CROSS.

Ohio Ferro-Alloys Corporation
Canton, Ohio

Here's a Jam Cracker!



Crack those jams, make work easier, increase the productive capacity of your employees and your plant with R & M All-Steel Hoists.

These new R & M hoists are designed for today's super-production demands—with steel construction from track to hook . . . typical American reliability for 24-hour-a-day service . . . ability to handle loads from any angle with perfect balance . . . speed plus safety . . . capacities ranging from 1,000 to 15,000 lbs. . . and power from famous R & M motors.

Note the low headroom that saves

vitaly needed plant space, and remember—R & M All-Steel Hoists are guaranteed by a firm that has done nothing but quality building for more than 50 years.

Mighty busy we are with our own war production problems. But helping you help Uncle Sam is part of our job. So tell us about your material-handling problems and you'll get a quick, practical answer that will save hours of precious time and may save you thousands of dollars.

Write today for Folders 800 and 801-I2 giving complete specifications on the entire R & M Steel Hoist Line.

ROBBINS & MYERS • Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

New Navy Contracts Force Expansion at Federal

• • • L. H. Korndorff, president of Federal Shipbuilding and Dry Dock Co., Kearny, N. J., a subsidiary of the United States Steel Corp., announced Jan. 24 that the Navy had awarded a large number of steel vessels to that company for immediate construction. This additional shipbuilding, added to the already heavy building schedule of the Kearny plant, will necessitate expansion of shipbuilding facilities, which will be built at the expense of and will be the property of the Navy. The yard will be operated entirely by the Federal company. It is estimated that the new shipbuilding plant will require a maximum of 10,000 employees.

The Federal company also announced that it has leased six tower floors in the National Newark Building, 744 Broad Street, Newark, N. J. The engineering departments, which for several years have been located at 21 West Street, New York, will occupy the Newark space in conjunction with the purchasing department. The general executive offices will remain at Kearny. The new offices will be occupied by Feb. 2.

U. S. Output of Manganese Ore 76,000 Tons in 1941

Washington

• • • Shipments of manganese ore (35 per cent or more manganese, natural) from domestic mines are estimated at 76,000 gross tons in 1941 compared with 40,123 tons in 1940, according to the Bureau of Mines. Arkansas, Montana, and Tennessee accounted for about 77 per cent of the total in 1941.

Imports for consumption of manganese ore containing 35 per cent or more manganese during nine months ended Sept. 30, 1941 consisted of 794,516 gross tons of metallurgical ore containing 381,898 tons of manganese and 25,099 tons of battery-grade ore containing 13,430 tons of manganese. During the entire year 1940, imports for consumption of both grades were 1,282,079 tons containing 617,101 tons of manganese. The countries of chief imports were Brazil, 208,970; Cuba, 164,819 tons; British India, 149,604 tons; and Gold Coast of Africa, 138,301 tons.

INDUSTRY

China Export Applications Must Bear United Trading Stamp

Washington

••• Acting upon a request of Generalissimo Chiang Kai-shek, the Board of Economic Warfare, Office of Export Control, has announced that henceforth no export license applications covering exportations to unoccupied China will be considered by it unless such applications bear the official stamp of the United Trading Corp., agency of the Chinese government.

In addition, the unlimited license held by the Universal Trading Corp. has been amended to authorize the exportation to unoccupied China of certain additional critical commodities vital to the Chinese war effort. These commodities are: copper; certain types of machine tools; nickel and low grade petroleum products.

No Priority Assistance For Air Raid Shelters

Washington

••• Because of the need of steel for military purposes, priority assistance will not be granted for the construction of air raid shelters. This was announced last Saturday by J. S. Knowlson, director of WPB's Industry Operations.

Benefiting from British experience and the skill of American engineers, OCD has developed a design for a reinforced concrete protective shelter, to hold 24 persons, which uses a minimum of metal. Even this shelter, however, the statement said, would require about 4750 lb. of steel for reinforcement and for a steel door.

Pleasant Named Head Of Grand Rapids Office

Detroit

••• Herman E. Pleasant has been named manager of the Grand Rapids office of the Division of Contract Distribution. His headquarters will be in the Michigan National Bank Bldg., 77 Monroe Ave., N. W., Grand Rapids. The new manager has just resigned a position as vice-president and general manager of the Cramp-ton Manufacturing Co., Holland, Mich., manufacturers of die castings.



• No pampered metals are ARMCO Stainless Steels. Wherever the sky-going is fiercest you'll find these strong, rustless, heat-resisting metals "take it" and come back for more.

America's great war-gearred aircraft industry uses ARMCO Stainless Steels for some of the most grueling tasks known to sheet metals. In fire walls and exhaust systems of the new super-powered warcraft ARMCO Stainless Steels defy temperatures up to 1650° F. In many other parts light though strong sheets of this hard, tough metal resist wear and corrosion, and withstand the vibration of roaring engines.

You'll like these other advantages of ARMCO Stainless Steels too: They form easily and can be fabricated by the fast spot-welding process. They have high strength/weight ratio and excellent transverse properties. No heat treatment is needed to develop the exceptional physical properties of these versatile metals.

If you make planes or parts for Uncle Sam's air armadas consider using ARMCO Stainless Steels. Write for fabricating information and the physical properties of these aircraft metals: ARMCO 18-10 Cb (Type 347), ARMCO 18-10 Ti (Type 321) and ARMCO 18-8 (Type 302). The American Rolling Mill Co., 551 Curtis St., Middletown, Ohio.

A LABEL KNOWN TO MILLIONS



Superior Ore Use Hits New Peak

Cleveland

• • • In 1941, 76,335,682 gross tons of Lake Superior iron ore were consumed by furnaces in the United States and Canada, as against the 62,426,314 gross tons consumed in 1940, according to the Lake Superior Iron Ore Asso-

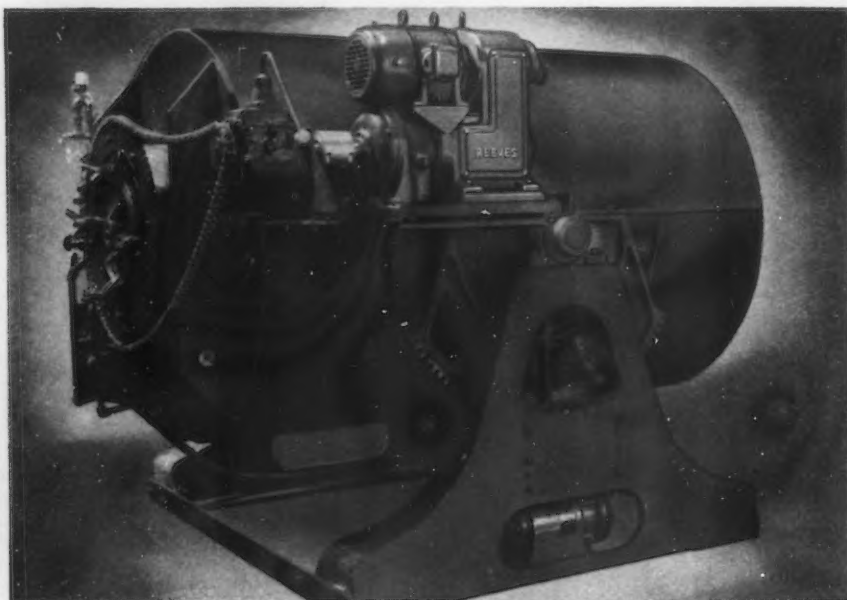
ciation. Of the total 1941 consumption, 74,570,871 gross tons went to blast furnaces in the United States and 1,764,811 gross tons went to Canadian blast furnaces.

At the year end total stocks at furnaces in the United States amounted to 34,335,369 gross tons, stocks at Canadian furnaces were 1,227,504 gross tons, and an additional 4,894,020 gross tons were

lying on the American side of Lake Erie docks, bringing total stocks of Lake Superior iron ore to 40,456,893 gross tons. On the basis of the December, 1941, rate of consumption, which amounted to 7,061,981 tons monthly, the year-end stocks would keep furnaces going until early May, not allowing for furnace enlargements and new units that will come into production in the meantime. Moreover, if 1942 consumption continued only at the December, 1941, rate, approximately 85,000,000 tons of Lake Superior iron ore would be required by furnaces in the United States and Canada, with any excess ore consumed over this amount dependent upon the new pig iron producing capacity brought into operation this year.

It is interesting to note that the ore brought down over the Great Lakes in the record 1941 shipping season amounted to some 80,000,000 tons.

On Jan. 1, 1942, there were 169 furnaces in blast in the United States and seven Canadian units operating for a total of 176 furnaces, while 12 American furnaces and one Canadian unit were idle.



Where Heat Treating and Tempering Must Be ACCURATELY TIMED

Used in the heat treating and tempering departments of many well known plants, this American Gas Furnace Co. Rotary Carburizer is equipped with REEVES Speed Control to provide a wide range of retort speeds, and regulation of the retort speed to give any desired heating period. This Carburizer has an average capacity of 1,800 pounds of work, and can handle a wide variety of product. The REEVES Vari-Speed Motodrive, which combines motor and speed varying mechanism, permits operation at exactly the proper speed, according to case depth required, kind of steel and nature of parts. REEVES Speed Control units are available in a wide range of sizes and designs. Easily applied to any type of production machine to provide complete speed adjustability. Write us.

REEVES PULLEY COMPANY, Dept. I, COLUMBUS, INDIANA

REEVES ACCURATE POSITIVE **Speed Control**

Steel Scrap Collections Improved at Toronto

Toronto

• • • While some betterment is reported in steel scrap collections, with consequent improvement in deliveries to the steel mills, there has been practically no change insofar as iron grades are concerned. Only small tonnages of cast scrap and stove plate are appearing on the market and dealers report demand well in excess of supply. A few of the larger melters that were successful in bringing in cast scrap from the United States during the summer are fairly well stocked for immediate needs and for a few months into the future, whereas those that depend on the domestic source of supply are practically out of scrap, with little prospect of sufficient deliveries to meet needs. Steel mills also are carrying stocks sufficient for the next two or three months, but beyond that period the scrap situation is doubtful.

Canada's Steel, Pig Iron Output Soars

Toronto

••• Production of iron and steel in Canada for the year 1941 topped all previous peaks by a wide margin and is slated for further substantial expansion in the current year. During December pig iron production exceeded the previous high record by 10.9 per cent, while output of ferro-alloys and steel ingots and castings fell slightly below previous highs, according to figures compiled by the Dominion Bureau of Statistics.

Pig iron production in December made the record total of 148,377 gross tons, compared with the previous high of 133,737 tons reported for November and against 110,477 tons in December, 1940. The month's output included 118,471 tons of basic iron; 13,251 tons of foundry iron and 16,655 tons of malleable iron.

For the year 1941 pig iron output totaled the record peak of 1,364,334 gross tons, a gain of 16.6 per cent over the 1940 production of 1,168,894 tons and more than 80 per cent above the 755,731 tons reported for 1939.

Production of ferro-alloys in December amounted to 17,845 gross tons compared with 17,078 tons in November and 18,397 tons in December a year ago. The month's output included ferrosilicon, ferrochrome, silicomanganese, ferromanganese, ferrochrome, silicon, silicospiegel and ferrophosphorus.

During the full year 1941 production of ferro-alloys made the record total of 190,374 gross tons, a gain of 40.6 per cent over the 135,412 tons for 1940, and was 153 per cent greater than the 1939 output of 75,234 tons.

In December production of steel ingots and steel castings amounted to 218,611 gross tons, compared with 221,367 tons in November and 188,420 tons in December, 1940. The month's total included 207,801 tons of steel ingots and 10,810 tons of castings.

For the year 1941 production of steel ingots and castings make the record total of 2,411,887 gross tons, or a gain of 19.7 per cent above the previous record of 2,014,172 tons reported for 1940, and was 74 per cent higher than the 1,384,827 tons produced in 1939.

Canada Requiring Permits For Plate Imports from U. S.

Ottawa

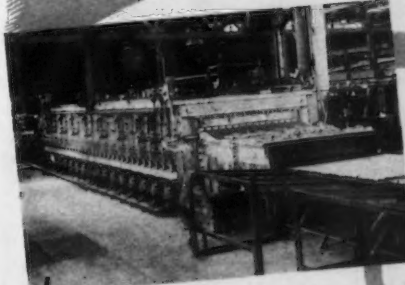
••• Importers of certain categories of steel plates must now obtain permission from the Steel Controller before placing any orders in the United States, it was announced today by the Department of Munitions and Supply. Because deliveries of plates more

than 96 in. in width are likely to be uncertain, the Controller warned Canadian fabricators against ordering such plates when narrower plates can be used. Shipyards and boilermakers purchasing plates to be used in work for the government-owned Wartime Merchant Shipping, Ltd., and the shipbuilding branch of the Department of Munitions and Supply are exempt from the new order.

FURNACES THAT SAY IT WITH

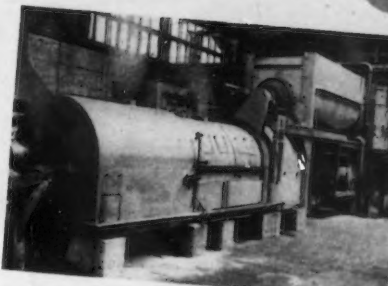
PRODUCTION

In the heat treatment of shells and other defense products, Rockwell Furnaces speak for themselves. Here are several of the many types that say it—convincingly—in terms of production.



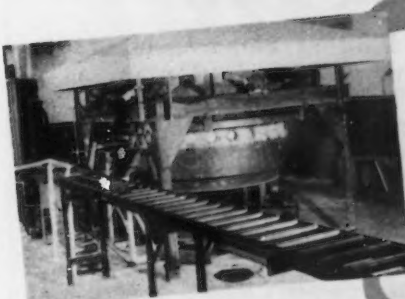
18,000 LBS. PER HOUR

This Gas Fired Roller Hearth Annealing Furnace handles cartridge brass slabs. Construction is unusually rugged—the rolls are extremely heavy, and the drive and all other parts are capable of this extreme production rate. Driven rolls carry the slabs from the charging table through preheating, heating and cooling sections, and on the discharge table to the dump mechanism.



3,000 LBS. PER HOUR

A Gas Fired Revolving Annealing Furnace (Retort Type) that is a complete unit for washing, annealing and pickling 50 caliber brass cartridge cups in a continuous, even stream. A great producer, it is also exceptionally economical from the standpoint of labor, fuel and in the use of acid.



70 SHELLS (4.5") PER HOUR

A Revolving Hearth Type Shell Nosing Furnace with openings around its outside circumference for receiving the shells. Heating is so controlled that no distortion occurs below the taper during the press operation. Charging and discharging from the same position requires only one operator—shells being sent to him on a conveyor. The absence of a water-cooled chill results in a great saving of fuel.

Because of standards already established, time-saving deliveries can be made on many types of Rockwell Furnaces that will step up your production. What is your heat treating problem?



W. S. ROCKWELL CO.

50 CHURCH STREET

NEW YORK, N. Y.

Ship Contracts Dominate Orders by Canada

Toronto

... Shipbuilding contracts totaling about \$10,500,000 dominated the list of war orders placed by the Department of Munitions and Supply for the week ended Jan. 13. Awards for the week had total value of \$23,779,265, and included only one United States order which

amounted to \$5356. Awards include:

Munitions—Creighton & Smith Motors, Fredericton, N. B., \$251,747; Renfrew Electric & Refrigerator Co., Ltd., Renfrew, Ont., \$128,802; Canadian Acme Screw & Gear, Ltd., Toronto, Ont., \$142,560; Robert Bell Engine & Thresher Co., Ltd., Seaford, Ont., \$61,425.

Metals—Metals & Alloys Limited, Toronto, Ont., \$22,800.

Shipbuilding—Dominion Engineering Works, Ltd., Lachine, Que., \$4,702,320; Halifax Shipyards Limited, Halifax, N. S., \$180,777; Canadian International Paper Co., Montreal, Que., \$24,786; Canadian Vickers, Ltd., Montreal, \$95,177; Hydraulic Machinery Co., Ltd., Montreal, Que., \$66,420; Stephens-Adamson Mfg.

Co. of Canada, Ltd., Belleville, Ont., \$289,752; John Inglis Co., Ltd., Toronto, Ont., \$2,382,480; James Morrison Brass Mfg. Co., Ltd., Toronto, Ont., \$65,960; Smart-Turner Machine Co., Ltd., Hamilton, Ont., \$55,879; Star Shipyard (Mercer's), Ltd., New Westminster, B. C., \$101,700; Webb & Gifford, Ltd., New Westminster, B. C., \$90,887; Ross & Howard Iron Works Co., Ltd., Vancouver, B. C., \$105,499; Vancouver Engineering Works, Ltd., Vancouver, B. C., \$723,579; Vancouver Iron Works, Ltd., Vancouver, B. C., \$1,602,326.

Mechanical transport—General Motors Products of Canada, Ltd., Oshawa, Ont., \$363,888; General Supply Co. of Canada, Ltd., Ottawa, Ont., \$49,334; Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., \$554,493; Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., \$877,320; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., \$1,091,865; Ford Motor Co. of Canada, Ltd., Windsor, Ont., \$36,924.

Aircraft—Aviation Electric, Ltd., Montreal, Que., \$215,100; Railway & Power Engineering Corp., Ltd., Montreal, Que., \$52,748; Switlik Canadian Parachute, Ltd., Montreal, Que., \$635,670; Duplate Canada, Ltd., Ottawa, Ont., \$23,781; Irvin Air Chute, Ltd., Ottawa, Ont., \$621,814; Link Mfg. Co., Ltd., Gananoque, Ont., \$527,219; DeHavilland Aircraft of Canada, Ltd., Toronto, Ont., \$768,488; Fleet Aircraft, Ltd., Fort Erie, Ont., \$24,755; Cockshutt Plow Co., Ltd., Brantford, Ont., \$79,199.

Canadian Car Gets \$60 Million Bomber Order

Ottawa

... Hon. C. D. Howe, Minister of Munitions and Supply, announced today that a \$60,000,000 contract for Curtiss navy dive bombers had been awarded to the Canadian Car and Foundry Co. The order will occupy the full facilities of the Fort William plant of the company, and the greater part of its Pointe St. Charles plant, until late in 1944.

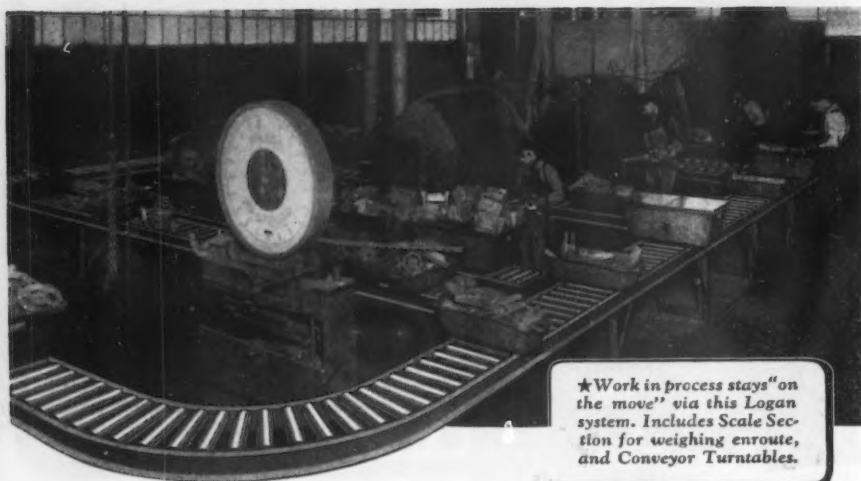
Mr. Howe said the order covers more than 1000 of the Curtiss aircraft, the latest type of dive bombers in the world. The contract calls for 12 months sustained peak production and the estimated maximum output is 80 per month. It is expected the first plane will be completed early in 1943.

Canada Names Director for Munitions Contracts Branch

Ottawa

... H. K. Thompson last week was appointed associate director general of the Canadian Department of Munitions and Supply's Munitions Contracts Branch. Mr. Thompson is a member of the law department of the Canadian General Electric Co., Ltd., and chairman of the legislation committee of the Canadian Manufacturers' Association. He has been acting as a consultant to the Munitions Contracts Branch for some months.

AMERICA . . . ★
*Don't be caught
with your Plants down!*



★ Work in process stays "on the move" via this Logan system. Includes Scale Section for weighing enroute, and Conveyor Turntables.

AVOID THIS worst kind of embarrassment! Plan now—to put your new war production on a streamline flow basis, with no delays, no work stoppage, no "plants down" along the way. Loganized plants stay UP on production, UP on speed, UP on deliveries. Act today, to keep your plants up, not down! Call in the nearest Logan Conveyor engineer. LOGAN CO., Inc., 545 Cabel St., Louisville, Ky

Logan Conveyors
PUT FLOW INTO PRODUCTION

1941 Construction Hits New Record High

••• Engineering construction awards in 1941 climbed to \$5,868,699,000, a new record high, 47 per cent above the previous all-time high mark of 1940, according to Engineering News-Record. Of the 1941 total, \$3,823,397,000, or 65 per cent, was for defense construction.

Every section of the country reported substantial gains over 1940. West of the Mississippi, the \$1,345,177,000 total was 92 per cent over last year's mark; Southern awards of \$1,245,275,000 were up 46 per cent; Middle Atlantic awards of \$1,211,361,000 gained 27 per cent over the 1940 peak; the Middle Western area, with awards totaling \$908,630,000, was up 22 per cent; Far Western awards, totaling \$846,547,000, gained 72 per cent from last year; and New England awards of \$311,709,000 exceeded 1940 by 28 per cent.

West of the Mississippi states led the country with 22.9 per cent of the total engineering construction for the year, due in part to the construction of new airplane plants. New construction financing in 1941, totaling \$7,895,129,000, topped the preceding year's volume by 103 per cent.

Blaw-Knox Nets \$1,668,311

••• Blaw-Knox Co. reports, subject to final audit, a net profit of \$1,668,311 for the year 1941, after deducting \$3,475,737 for income taxes and non-recurring losses. This profit is equivalent to \$1.25 per share and compares with \$1.02 per share for the year 1940. The company's unfilled orders are practically 100 per cent in connection with direct or indirect war production and are the largest in its history. Shipments during 1941 approximated \$30,000,000, the largest in the company's history. During 1941 the company provided over \$2,000,000 of its own funds for the expansion of necessary facilities.

Open DCD Office in Decatur

Decatur, Ill.

••• A branch of the Division of Contract Distribution has been opened here with Eugene W. Bassett as acting manager. This brings to 113 the number of such offices of DCD.

Warner & Swasey Will Again Expand Capacity

Cleveland

••• The Warner & Swasey Co. has announced a \$2,700,000 expansion plan to permit a further increase in production by 40 per cent (see THE IRON AGE, Jan. 22). Of this plant enlargement, the Defense Plant Corp. will finance \$2,250,000 to construct a

new \$750,000 plant alongside the company's present location and furnish it with \$1,500,000 worth of machines and equipment to be installed in its 110,000 sq. ft. of space. The balance of the expansion, to be financed by the company itself, will consist of the construction of a \$450,000 addition on the north side of the company's present building, and will contain 30,000 sq. ft. of floor space.

FOR
BLACKENING
STEEL PARTS



On a Production Basis!

• Pictured above is a commercial HOUGHTO-BLACK installation in a large Chicago plating company, which illustrates how the simplicity of this low cost process makes it readily adaptable to production line work.

Comprising a single-bath treatment at 290°-295° F., with pre-clean and hot and cold rinses, the HOUGHTO-BLACK method offers a process which gives steel parts an even, lustrous black color, resisting oxidation and improving appearance.

It is being used for a myriad of applications, including a finish for machine guns and small arms parts, because it is more rapid, uniform and operates at lower temperatures than processes formerly employed. Ask the Houghton Man, or write for factual folder at right.



E. F. HOUGHTON & CO.

Chicago

• PHILADELPHIA

• Detroit

HOUGHTO-BLACK

Bethlehem Profit Down \$14 Million in 1941

••• Net income reported by the Bethlehem Steel Corp. for 1941 was \$34,457,796 after depreciation, depletion, taxes, etc., or \$9.35 a share on common stock, compared to a net of \$48,677,524 for 1940. Fourth quarter earnings in 1941 totalled \$10,459,742, compared to

\$14,677,524 during the same period of 1940.

Bookings during 1941 were valued at \$1,084,600,000, and orders on hand at the end of the year were \$1,327,500,000. Total taxes for 1941, paid or provided for, equaled \$110,002,700, or \$36 a share on common stock. A dividend of \$1.75 a share on preferred and \$1.50 a share on common

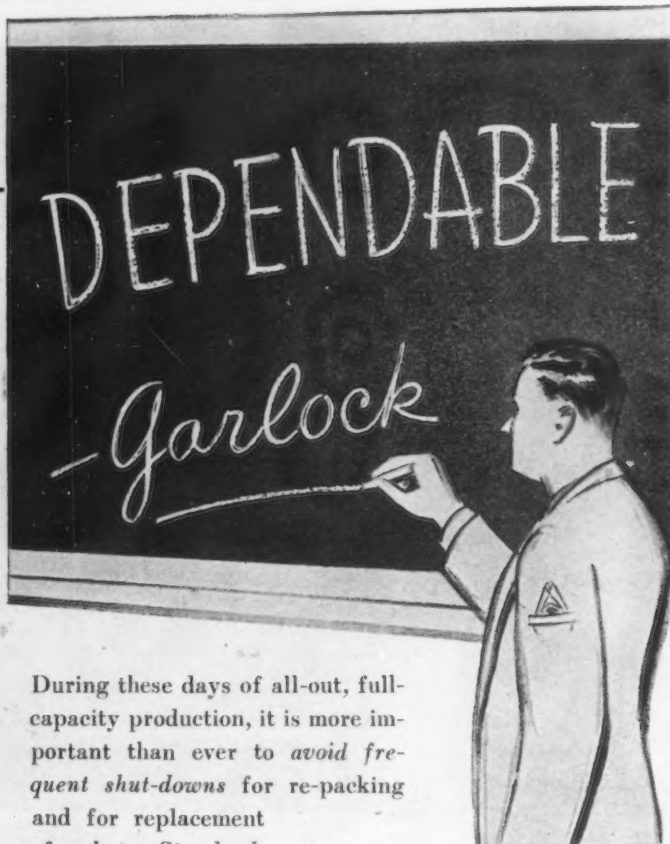
stock was declared at the year-end meeting.

Average steel ingot production during 1941 was 101.5 per cent, and the rated capacity was increased from 11,950,000 tons to 12,700,000 tons during the year, resulting from the addition of five new open hearth furnaces and the adjustment of capacity figures of existing furnaces.

During the coming year, to government account, Bethlehem will build and operate three blast furnaces increasing iron production by 1,250,000 tons; steel producing equipment sufficient to increase production 1,000,000 tons a year; a new sheared plate mill at Sparrows Point rated at 720,000 tons a year; and added facilities for the manufacture of structurals, shapes, bars, and shell steel, 300,000 tons of the latter group being on the Pacific Coast. In addition, three new shipbuilding yards and additional repair facilities will be added, as well as two electrolytic tin lines and black plate bonderizing equipment at the Sparrows Point tin plate mill. The tin lines will go into operation by July 1 and are rated at 2,500,000 base boxes per year.

Current operations are down to 98 per cent, because of low scrap supplies, but it was stated that the three new blast furnaces, at Sparrows Point, Lackawanna, and Bethlehem, to be completed within 14 months, will permanently relieve the scrap situation.

Steel orders now on hand were said to total between 4,250,000 and 4,500,000 tons and bookings are continuing to be placed in great volumes. The S. S. Benore, sunk by Axis submarines on Jan. 24th off the coast of North Carolina, was a Bethlehem Steel Corp. boat, operated by the subsidiary company, the Ore Steamship Co. The Benore, carrying 23,000 tons of Chilean ore when sunk, operated regularly between the United States and Chile on ore transportation, and carried at the rate of 200,000 tons of Chilean ore, representing 125,000 tons of finished steel, to this country per year. The loss of this boat's services will be felt severely by the company, probably resulting in reduced ore imports.



During these days of all-out, full-capacity production, it is more important than ever to avoid frequent shut-downs for re-packing and for replacement of gaskets. Standardize on GARLOCK and be sure of long, dependable service.

THE GARLOCK
PACKING
COMPANY

PALMYRA, N. Y.

In Canada: The Garlock
Packing Company of Can-
ada Limited, Montreal, Que.



Garlock Lattice-Braid Packing is unusually flexible. Its unique structural design imparts semi-automatic pressure action. Available in several styles for various types of service.

J. & L. Earns \$4,234,599*Pittsburgh*

••• Jones & Laughlin Steel Corp. reports for the quarter ended Dec. 31, 1941, subject to annual audit and adjustment, a consolidated profit for the corporation and its subsidiaries of \$4,234,599 after all charges, including depreciation, interest and taxes. This compares with a profit of \$4,044,126 reported for the quarter ended Dec. 31, 1940. Consolidated profit for the year ended Dec. 31, 1941, after provision of \$1,000,000 for contingencies, shows \$16,274,983, compared with a profit of \$10,277,029 in 1940. The 1941 figure is the best since 1929 when the company's net income was \$20,848,749.

Inland 1941 Earnings Reported Up 2.5%*Chicago*

••• Net earnings for Inland Steel Co., and subsidiary companies for the year ended Dec. 31, 1941, were reported at \$14,824,053 after deductions for depreciation, depletion, and taxes, equal to \$9.08 a share on stock outstanding, compared to a net profit of \$14,450,385 for 1940. A cash dividend, announced simultaneously with the earnings, of \$1.00 per share on capital stock was declared.

J & L, Republic and Great Lakes to Roll Truck Bed Plates*Philadelphia*

••• Bed plates for the 340,000 cargo truck bodies that will be built in the next year by the E. G. Budd Mfg. Co., at its Philadelphia and Detroit plants, will probably be rolled by three steel companies, Jones & Laughlin, Great Lakes, and Republic. These producers are the only ones with strip mills that can handle the 81 in. wide plates. While several plate producers could handle the work, the thickness of the material, 10 gage, makes it undesirable to tie up plate mills when they could be rolling thicker plates for ships and railroads.

The cargo truck bodies will be interchangeable on the trucks with bodies designed for personnel transport, facilitating handling of men and supplies. Loaded trucks will be unloaded simply by lifting the body off the chassis and installing an empty one.

Canadian Car to Build 1000 U. S. Dive Bombers*Toronto*

••• C. D. Howe, Minister of Munitions and Supply, announced that Canadian Car & Foundry Co., Ltd., has been awarded a contract for construction of 1000 Curtiss Navy Dive Bombers, representing cost of \$60,000,000. Referring to the order Victor M. Drury, president of the company stated: "The

order will occupy the full facilities of the company's Fort William plant and the Turcot Aircraft plant at Montreal, as well as the greater part of the company's facilities at the Pointe St. Charles machine shop, Montreal, until late in 1944. The contract calls for 12 months of sustained production with a maximum output of 80 planes per month. It is expected the first plane will be completed early in 1943. Preliminary tooling up already is in progress."

Gair-Locked Milling Cutters Solve Production Problems --- Conserve High Speed Tungsten Steel.

Our adjustable Inserted Blade Milling Cutters are made as small as $2\frac{1}{2}$ " diameter with a rigidity that produces solid tooth cutting action, utilizing the full machine capacity with greater feeds and deeper cuts. Have you a tough defence production problem?



The GAIRING TOOL CO., Detroit, Michigan
In Canada: Hi-Speed Tools Ltd., Galt, Ont.

FOR A QUARTER CENTURY SPECIALISTS **Gairing TOOLS** IN FINE CUTTING TOOLS

U. S. Seen Well Fixed On Air-cooled Engines

Detroit

••• Lieut. General William S. Knudsen, coming home to Detroit for the initial meeting of the Engineering Society of Detroit in its new headquarters, the Horace H. Rackham Educational Memorial building, addressed 1000 members of the society here Friday night.

Knudsen, a member of the Society himself, is also one of the trustees of the Rackham Engineering Foundation.

Talking to fellow engineers and production experts, Knudsen declared that the secret of mass production of airplanes is to "get one airplane in one plant" and concentrate on the output of that type plane alone. The process then is much faster than attempting to

produce two or three types in one factory, he said. The start toward quantity production of airplanes came with the placing of French orders for 4500 to 6000 planes in 1939, and the American-British orders for 33,000 planes subsequent to the fall of France laid the basis for the 60,000 plane rate sought by the President in 1942.

The United States is "well fixed" in the production of air-cooled aviation engines and did not have to engage in development work on these types "except about 2800 cu. in." sizes, he declared. The Allison liquid-cooled engine has come through the development stages and into mass production in record time, he indicated, adding that "I saw the nation's second liquid-cooled engine getting into production today." In a year we will be on "safe ground" with liquid-cooled types, he predicted. (He did not name the new liquid-cooled engine, but engineers speculated that it was a Continental development.)

Even though there was not much interest a year or so ago in four-engine bombers, it has been demonstrated that the distance from London to Berlin and back again requires this size plane and we are now "going to get a lot of them," he said.

The 28-ton tank was also not overly popular with military men, he said, until these monsters played havoc with the French forces. There were no real designs, "just models" at first, but they have been developed and a lot learned about the tank, and its production. Of problems in tank building he declared colorfully, "When you start to 'play horse' with 28 tons, something shakes loose".

The British have used huge lorries, or moving vans, to move tanks to battle sites so the tanks won't wear themselves out getting to the fight, he said. An armored force must be quick to make repairs, or the enemy moves in and seizes the tank. Germany uses tow wagons to get damaged tanks out of action, he added. Our winning of the war will be done through having the best men and the best equipment, Knudsen declared.

In an impassioned plea that outpeaked anything his associates have ever heard from him, Knud-

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round and flat wire springs
and wire parts.

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The Army needs pots
and pans and baskets,
pails and buckets

FOR ALL OF WHICH
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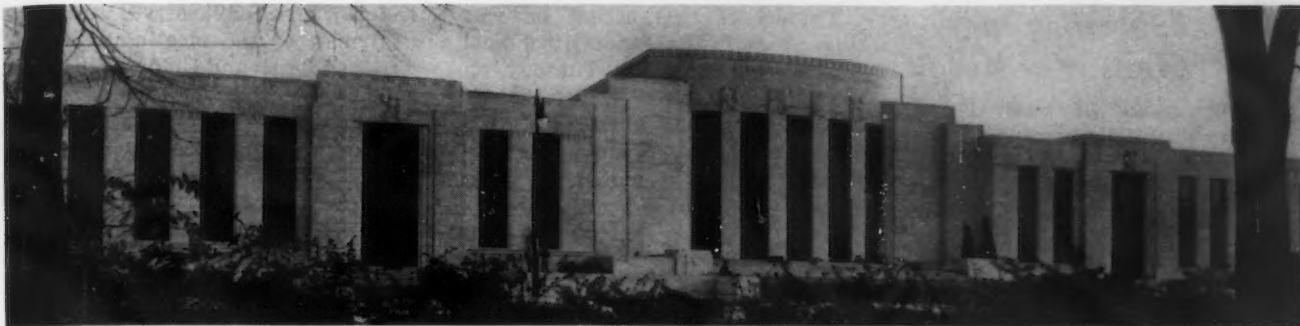
IF YOU USE WIRE HANDLES for
government, industry, or con-
sumer requirements . . .

Whether for dish pans, pots,
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Rackham Building Dedicated: Dedicatory exercises for the Horace H. Rackham Educational Memorial building, jointly owned and occupied by the Engineering Society of Detroit and the University of Michigan extension school division, were held in Detroit last Wednesday, Jan. 28. The building is dedicated to the late attorney and humanitarian, whose fortune was made through investment in the Ford Motor Co. in its earliest days. It is a gift of the Horace H. Rackham and Mary A. Rackham Fund.

sen asked for more anti-aircraft and anti-tank guns to be turned out by the automotive industry.

"Get your processes laid out to do the job in your old way," he urged. "Use your heads, and bring us whatever ideas will get us more guns."

"You are using a lot of milling machines and a lot of cutters on these gun jobs. Get your 'boys' to use them better, so they'll last longer. . . . on machine guns—that's a milling machine job, that's all there is to it. But get your brains into the job and reduce the number of operations. It's a job that really lends itself to mass production," Knudsen said.

"I've been in this program in Washington since its inception," he declared, "and I have seen how impossible it is to superimpose the war program on civilian production.

"I wonder how many of us realize that we are really in this war; that our boys are being killed in the Philippines, in Libya, in Burma. Don't you think that it's about time that Americans got sore about this?

"Instead of sitting down to breakfast and patting the Russians on the back, let's begin to think of what we are going to do to that other fellow who is knocking us on the head!"

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Quickly
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B. t. u. output are available. Group installations can be arranged to heat any large industrial building.



We are prepared to quote on the bare units or complete installation. Dravo Bulletin No. 502 contains complete, usable data and will undoubtedly save you weeks of time. Time was never more precious—if your job requires heat quickly and economically for years to come—consult your Sweet's or write us for descriptive literature.

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A. I. M. E. Meeting to Stress War Needs

• • • Discussions of methods of expanding mineral production to meet war time demands will hold the limelight at the 156th meeting of the American Institute of Mining and Metallurgical Engineers, to be held in New York from Feb. 9 to 12.

Typical of this accent on war time needs is the general technical session scheduled for Tuesday on the subject "Ores, Metals and the War." Industrial authorities, officials of OPA, WPB and other governmental agencies will endeavor to paint a picture of the nation's position with respect to critical and strategic minerals and will point out methods of expanding produc-

tion. Wilfred Sykes will serve as chairman of the meeting, assisted by C. K. Leith and Clyde Williams.

The general headquarters of the institute's annual meeting will be the Engineering Societies Building, 25-33 West 39th Street. The annual business meeting and numerous other technical and social meetings will be held there.

Special features of the annual gathering include the Howe Memorial Lecture, to be delivered this year by John Johnston, director of research, U. S. Steel Corp., and the Institute of Metals Lecture, to be given by W. R. Webster, chairman of the board of Bridgeport Brass Co.

At the annual banquet on Wednesday, the Iron and Steel Division's Robert W. Hunt prize will be awarded to H. K. Work, manager of research and development, Jones & Laughlin Steel Corp. The J. E. Johnson, Jr., Award will be presented to L. F. Sattelle, superintendent of pipe mills, National Tube Co., McKeesport, Pa.

The all-institute luncheon is scheduled for Monday at the Commodore Hotel. Lord Marley, a member of the House of Parliament from 1930 to 1941, will speak on "British Unity for War Production."

Numerous technical papers to be presented at the convention cover subjects ranging from the characteristics of New Jersey iron ore to industrial education techniques. Papers dealing with non-ferrous metallurgy will be presented largely on Wednesday and Thursday, while the Iron and Steel Division meetings will be held consistently from Tuesday through Thursday.

Bethlehem Builds New Blast Furnace

Buffalo

• • • Bethlehem Steel Co. has under construction at its Lackawanna plant a new blast furnace equal in capacity to the new stack completed last November at a cost of approximately \$1,125,000, it was announced here this week. The new furnace probably will not be ready for production much before 1943. This will give the Lackawanna plant seven blast furnaces. Construction of the new unit recently was authorized by the Defense Plant Corp.



TODAY, the weapons of war and the tools of peace are largely mechanized. The home, the factory, the battlefield—all are made more efficient by mechanical means.

America's foremost designing engineers—the men who are responsible for greater strides in mechanical progress—are building Ampco Metal, that sturdy alloy of the aluminum bronze class, into dominant machines where it safeguards highly-stressed parts against wear, impact, and failure. Ampco bronzes are recognized as tops where a metal that can "take it" is needed.

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Ampco Metal is made in six grades of hardness and physical properties, with high tensile strength, controlled hardness, excellent compressive strength, and stubborn resistance to wear, "squashing out," impact, and corrosion. It is suitable for use as bushings, gears, slides, gibs, shifter forks, and a host of other applications. Ask our engineers how Ampco Metal can help you. Literature will be sent upon request.

AMPCO LITERATURE Available

AMPCO METAL, catalogue 22
Ampcoloy—Industrial Bronzes
Catalogue
Ampco-Trode Coated Aluminum
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Ampco Metal in Machine Tools
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Bearings
Ampco Metal in Dies
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Department IA-2 Milwaukee, Wisconsin

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The Metal Without An Equal



British-Combine Photo

AUSTRALIA AT WAR: Australia is not only supplying foodstuffs and men for Great Britain, but Anzac munition factories are turning out shells, bombs, guns, depth charges, and other war engines. Here machined parts are being assembled in fuse bodies. Fuse bodies and parts are also being made by die-casting in Canadian munitions plants as described in *THE IRON AGE*, Sept. 4, 1941.

Pig Iron Supplies Face Tighter Period

Pittsburgh

••• Pig iron supplies are expected to get tighter as the months go by, especially in those cases covering requirements which do not have high priority ratings. In many instances in the past several months, pig iron consumers have not been seriously affected because of a small amount of inventory and because of the excellent handling of pig iron allocations. However, with steel mills drastically up against it for scrap, it is obvious that some additional redistribution of pig iron will have to be made to open hearth furnaces. The release of material formerly reaching the automobile industry for production of cars is expected to be used up by new defense projects. Pig iron makers believe that in the future months the shipment of supplies to consumers having A ratings towards the bottom of the list as well as B ratings, may be sharply curtailed.

Navy "E" to Wyckoff Steel and McKay Co.

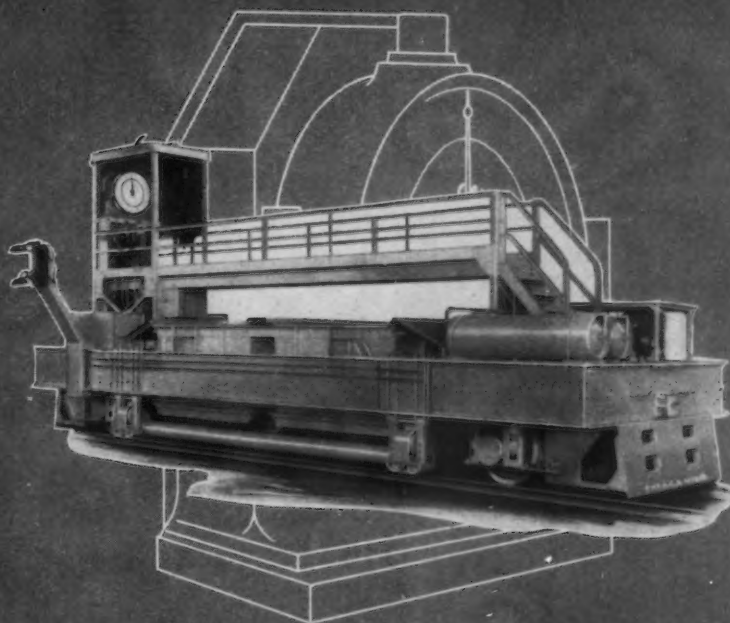
Pittsburgh

••• The Navy "E" pennant and Bureau of Ordnance flag was presented to Wyckoff Drawn Steel Co., at Ambridge, Pa., by Lt. Comm. N. S. Prime, USN., at a ceremony held last Saturday. J. T. Somers, president of Wyckoff

Drawn Steel Co., accepted the flags.

••• The McKay Co., Pittsburgh, normally a manufacturer of commercial chains but now almost wholly engaged in fulfillment of special naval contracts, last week received the Navy "E", given for excellence of performance, and the Bureau of Ordnance flag for their outstanding work on government orders.

Atlas Scale Cars



Atlas designed and Atlas built Scale Cars with the exclusive Atlas Dial Scales and Type-printing Recorders . . . effectively solve the problem of lowering material haulage costs. Specifically designed to meet the requirements of the individual plant . . . Atlas Scale Cars weigh the material, giving a printed record of each load. Shown above is an Atlas double-compartment, bottom dump scale car with Atlas underslung suspension scales, 30" diameter Indicating Scale Dial and Type-printing Recording Attachment.

Write for more detailed information.

The ATLAS CAR & MFG. CO.

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"Blow For Tonnage," Furnace Men Urged

Cleveland

••• "We can make 10 per cent more pig iron, or 6,000,000 more tons, if we put into our effort what our soldiers, flyers, and sailors are putting into it," was the opinion expressed to THE IRON AGE by Arthur G. McKee, president of Arthur G. McKee & Co.

"For many months past," Mr. McKee went on, "many of us have been greatly concerned about the rapidly diminishing supply of steel scrap and the resultant lack of progress in increasing the production of steel ingots so necessary for our tremendous war effort. Our brave men are dying in the Philippines and elsewhere for lack of ships, guns, tanks and airplanes. For their manufacture we need steel, and ever more steel, and for the

lack of scrap we are likely to make less steel this year than we made in 1941. In all seriousness let us ask ourselves what are we going to do about it?

"Of course, we can put a bonus on the difficult and remote scrap which may help somewhat but the only real answer is pig iron. For this, we are going to build 33 blast furnaces, but we will have to wait from 15 to 18 months for the first of these, and it will be 2½ to 3½ years before the last of them will be completed and producing pig iron. But we need the pig iron *now*, and not in 18 months or 3 years. These 33 furnaces when completed should produce 12 to 15 million tons of pig iron per year but that will be entirely too late to save our boys at the front.

"What can we do? We now have blast furnaces in operation which will normally make about 60 million tons of pig iron in 1942. But if we do quickly a few things which will cost a lot less than new blast furnaces, we can certainly increase this 60,000,000 tons by 5 per cent or 3,000,000 tons per year, and if we should go "all out" for more pig, I believe we can increase the output by 10 per cent or 6,000,000 tons, the equivalent of 15 of the proposed 33 blast furnaces. This iron would be available part now and the balance in a few weeks or months instead of in 2 or 3 years.

"How shall we do this? There are several things to do among which are the following: (1) We have always run our furnaces to use as little coke as possible per ton of output. Instead, let us ease up a bit on coke economy and blow for tonnage. (2) We have always run to keep down the flue dust produced. Let us blow for tonnage and sinter the extra flue dust, which sinter will make the furnace run more smoothly. (3) The open-hearth men have always yelled their heads off if the silicon or sulphur got above their pet maximum. Suppose we let them 'holler' a bit and run for tonnage even if the silicon and sulphur do run up a bit and, if necessary, treat the metal with roll scale and soda ash in the runners or in the ladles. *But* let us get the tons.

"Of course, someone will say there isn't enough coke and ore available. But let us remind him that there are some 12,000,000 tons



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Forging lubricants containing "dag" colloidal graphite are helping to set new records in the production of shells . . . "Dag" colloidal graphite increases die and mandrel life, reduces sticking and improves the finish. Send for bulletin number 130Q and be sure to ask for the name of your local supplier.

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of coke from commercial ovens going to domestic use. Let us change the coal mixtures on these ovens and divert as much of this coke to blast furnaces as may be needed. To supplement this increased amount available for blast furnaces, some of the idle beehive coke ovens might be rehabilitated for use during the present war.

"As for the supply of iron ore, let us recall the recent statement of Captain Vickery of the Maritime Commission, that they are allowing the salt water builders of cargo ships only 14 weeks to build a cargo ship. If lake cargo ships for ore are given *allocations* of all of the plates, engines, pumps, and whatever else may be needed, the lake ship builders *should* and *can* build ore boats in 6 months but there must be no dilly-dallying by a lot of panty-waists if these boats are to haul much ore during the 1942 season.

"Someone at once insists that most of the furnaces are blowing all that their blowers will produce. Well, I have looked into that and wish to suggest that small piston air pumps, preferably motor-driven, can be produced and installed in a few months. These pumps can blow from 5,000 to 12,000 cu. ft. of air up to 30 lb. into the cold blast main and in exactly constant volume and the governor of the turbo or blowing engine can control the total volume with its present accuracy. They would supplement the turbo-blowers.

"With more sinter in the burden the furnace can produce more iron, I was in a plant the other day where they have an excellent sintering plant and found that it was running only one shift. Let us use all of our sintering plants to their maximum capacity and build more capacity in a few months to make more iron.

"Many of our furnaces are running on coke made from straight high volatile coal. Let us put the proper percentage of low-volatile coal in these ovens and let us beneficiate the coal by washing and cleaning and let us do these things now to make more pig iron and to save the lives of our men in the front lines.

"Let us run our furnaces on leaner slags, less slag volumes and let us study our slags with our old

friend, Dr. McCaffrey, and we can produce more iron.

"The much discussed subject of dry blast is worthy of careful consideration and while many blast furnace operators doubt the large benefits as claimed for this equipment, it is undoubtedly true that some increased tonnage should be made available by its use.

"To all of my many, many friends who run blast furnaces and

open-hearths and all of the other innumerable units which comprise the steel industry, please understand that not a word of the above is stated in criticism. It is said in behalf of our soldiers, who need so badly all of the things that are made of iron and steel.

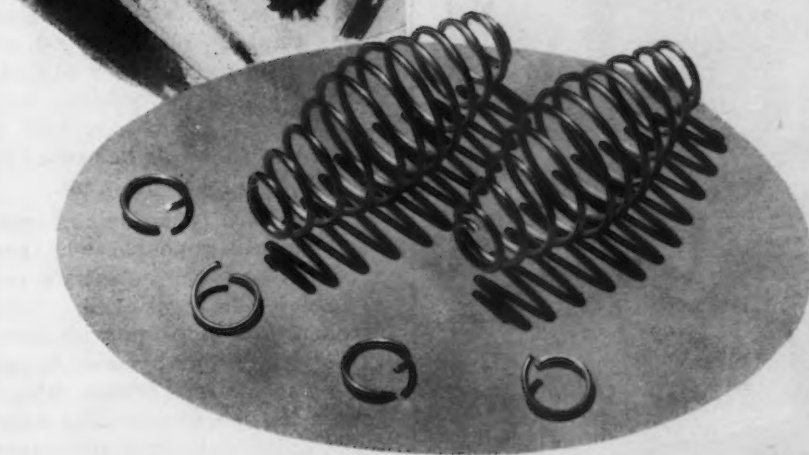
"Let us remember Pearl Harbor and MacArthur's brave but exhausted men and let us make more and more pig iron."

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they need to work!

THESE "Suicide Springs" for ammunition are called on to do their vital job but once—and that job blows them to "smithereens!"

For their lifetime of one single spring action, they're built to the same fine tolerances—with the same care, precision and accuracy that goes into all Accurate Springs.

For what purpose do you want springs? You can get them at Accurate.



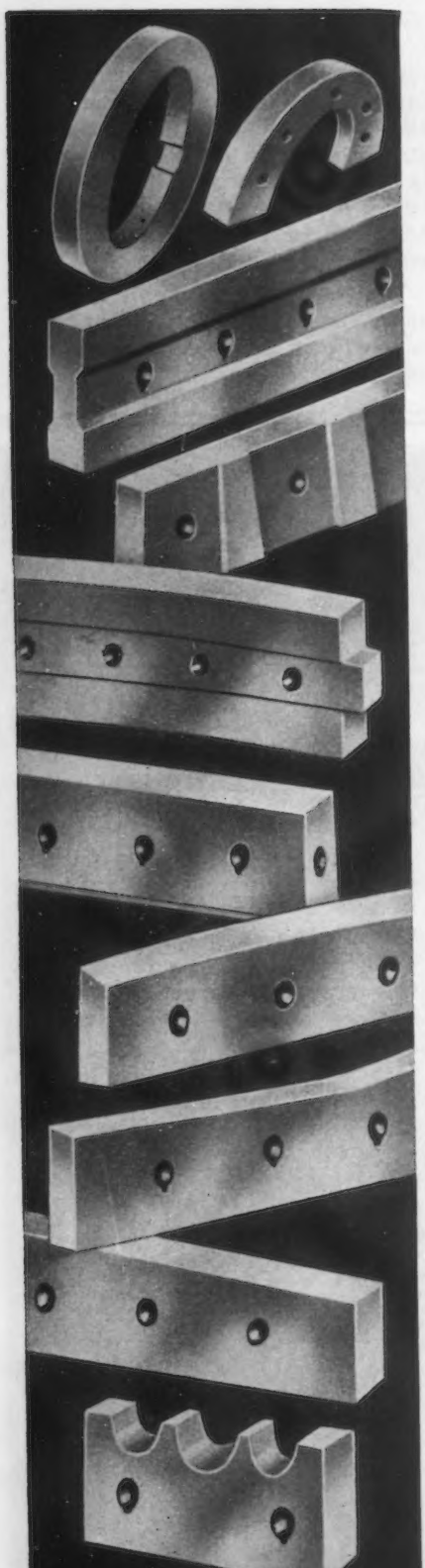
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NEWS OF INDUSTRY

War Has Priority On All, Witherow Says

Pittsburgh

• • • Industry's production to arm the nation's fighting forces will only be limited by the human endurance of the men who man and manage its facilities, William P. Witherow, president, Blaw-Knox Co., told Pittsburgh Chamber of Commerce industrialists here last week in his first speech since becoming president of the National Association of Manufacturers.

Scoffing at doubting Thomases who questioned the ability of industry to meet the President's gigantic war plan, Witherow said, "The genius of American industry with its driving power, skill, and ingenuity and dedication to deep patriotic devotion, cannot fail to meet what seem to be fantastic requirements."

Pledging the whole-hearted co-operation of industry to the war program, he said "war has priority on every man and woman's service, fortune, and life."

Declaring industry had not failed in its production of war materials during the past 18 months, Witherow pointed out that from July 1, 1940, through September, 1941, actual deliveries of defense goods totaled \$10,550,000,000 and by the end of December \$15,250,000,000, almost two-thirds more than industry had been told 10 months before would be needed for the whole defense program.

"There are some misinformed and misguided people who continue to question industry's performance," he continued. "This contention would come with better grace if it did not arise so largely from those same critics who, a generation ago, were calling American industrialists war-mongers and merchants of death, and who, as late as Dec. 6, 1941, were accusing these same so-called "business-as-usual-companies" with hogging all the defense contracts. It is somewhat absurd to be excoriated simultaneously for both hogging defense and avoiding it."

"The effects of such a tremendous war production have barely begun to leave its mark upon our

SALVAGE FOR VICTORY!

This is the slogan with which the new War Production Board has launched a nation-wide campaign for waste materials.

In every community organizations are being perfected to bring hidden scrap into the market. We continue to urge, as we have for many months, that every industrial manager or employee search his own plant for iron and steel scrap and ship it at once.

This company is devoting its best efforts and its advertising space to one of the great problems of our war program — increasing the supply of scrap for steel mills, blast furnaces and foundries. We solicit your aid.

The transition of many industrial plants to war production has temporarily curtailed shipments of scrap from some of the regular sources—the automobile industry, for example. Thus it becomes increasingly important that other sources be tapped to supply the deficiency.

Sell your obsolete equipment or other stored scrap at once—one of the most useful contributions you can make NOW to Winning the War.

If we can be of help in the disposal of your scrap, 'phone or write—

The
**CHARLES
DREIFUS**
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Heavy "Fluid-Fusion" Welded Vessels made at the Sharon plant of General American Transportation Corporation get their baptism of fire in a huge car-type annealing furnace. Oil-fired under automatic temperature control which varies less than 10° at 1100° to 1200° F., this heat treatment effectively relieves stresses of all types. G. A. Pressure Vessels pass the most critical tests without a quiver. They make good because they are made right.



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NEWS OF INDUSTRY

normal life," said Witherow, "and our civilian population will find that it must sacrifice far more than tires, lipsticks, golf balls, and weather reports before we have tasted victory. But we come from strong forebears and there is no fear in my mind that Americans can't take it."

Praising the integration of the defense program under Donald Nelson, Witherow said that he believed Nelson was going to set up the latest and best of the alphabetical agencies to get the job done—a government PDQ Bureau. "Nelson will get the best that American industry has to give. I realize, in saying that, that he is a Missourian—but we will certainly show him."

Benjamin F. Fairless, president, U. S. Steel Corp., who acted as toastmaster at the Pittsburgh Chamber of Commerce annual dinner, warned Pittsburghers to be alert continuously to those things that can undermine its position and to shun any feeling of smugness, complacency, or impregnability. Specifically he said, "For many years, steel mills in the Pittsburgh area have felt the absence, locally, of large consuming capacities in important lines of products, similar to those developed elsewhere, for instance, by the automotive industries."

"Again, our local mills are forced to ship heavy tonnages to the large Eastern markets to find adequate outlets in the fabricating trade. They are thus concerned with the question of transportation costs, and the manner in which those costs may change from time to time. In the matter of plant expansions, although the decisions may be favorable to Pittsburgh, the margins are often very narrow and would require a change in only one or two factors to tip the scales in the other direction. Rules and regulations which alter local conditions are often unwittingly disturbers of the economic balance, and can throw a large operation out of phase. So I repeat, that while we look with some satisfaction upon what has been won for this district, substantial efforts must be made to keep it won."

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Here is Chemical Equipment whose corrosion resistance does not depend on merely a surface lining... HAVEG is corrosion resistant throughout its entire mass. HAVEG is a strong, tough and durable molded plastic... impervious to rapid temperature changes... unaffected by temperatures up to 265° F. It is being successfully used in acetic acid service... hydrochloric... hydrofluoric... sulphuric up to 50% concentration.

Available as PIPING... VALVES... FITTINGS... FUME DUCT... TANKS... TOWERS... seamless one piece units as large as 9' diameter and 9' high.

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LEE SPRING COMPANY, Inc.
30 MAIN STREET BROOKLYN, N.Y.





This heavy duty rotary valve gives simple, accurate control of air operated equipment. One pedal pressure operates the cylinder, and the second pressure reverses the cylinder. Hannifin dependable disc-type valve design gives positive control and prevents leakage.

There is no packing, and no leakage or packing maintenance troubles.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric and special models. Write for Valve Bulletin 34-A.

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HANNIFIN "Packless" VALVES

AIR CONTROL

(Continued from Page 93)

charge from the factory at "carload" rate; (c) 5 per cent of the total of the list price plus the transportation allowance, or \$75, whichever is lower, and (d) an amount equal to 1 per cent of the list price, or \$15, whichever is lower, for each calendar month or greater part thereof that has elapsed between Jan. 31, 1942, and the date of sale. If any of the standard equipment has been removed the maximum price must be lowered by the retail value thereof.

Drum Schedule Revised

• • • Limitation of the ceiling of three classifications only is provided for in immediately effective modifications of Price Schedule No. 43, covering used steel barrels and drums, announced Feb. 2 by OPA. These are the 50 to 58 gal., the 29 to 33 gal. and the 14 to 16 gal. capacities. These three sizes include 98 per cent of all steel and drums in use. No other capacities than these are covered by the ceiling as amended.

The ceiling price for raw used drums has been extended to any purchaser, instead of only the user and reconditioner as before. Definition of a reconditioned drum has been tightened to insure that complete reconditioning is necessary to obtain the price differentials granted in the schedule for reconditioned drums.

Rail Prices Revised

• • • Amendment No. 1 to Price Schedule No. 46, relaying rails, was issued by OPA Feb. 3. The amendment extends the time limits for filing of reports on transactions in relaying rails from 10 to 15 days. Among other changes effected under the amendment are: Denver, Colo., added to the list of basing points; maximum price when sold from reconditioning warehouse is changed from \$32 per net ton to \$32 per gross ton for quantities of one carload or more, and charges for extras are permitted where such extras are furnished to meet purchaser's specifications.

Markup on Export Sales

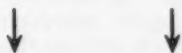
• • • "Export agents" are permitted a .5 per cent margin above maximum domestic iron and steel prices, and "export merchants" are

permitted a 10 per cent margin, under a revision of Price Schedule 49, issued Feb. 2.

Export agents are defined as: "any exporter who acts directly for a foreign purchaser in a sale between any seller in the United States and such foreign purchaser, and who does not take title to the goods being exported, or assume a risk of loss because of demurrage, failure to secure shipping space or otherwise."

Export merchants are defined as: "any exporter who acts as a principal, directly to a foreign customer and buys for his own account, and takes title to the goods directly or through an agent, and assumes all risk of loss because of demurrage, failure to secure shipping space, damage to the goods, or otherwise."

Mill export sales still are governed by Price Schedule 6. Warehouse export sales are covered by the domestic prices under Schedule 49.



Refractories Stabilized

••• Maintenance of present prices of basic refractory brick is provided for in signed agreements with OPA by the three producers of steel furnace lining material. The three signatory companies are the Harbison-Walker Refractories Co., Pittsburgh, and E. J. Lavino and the General Refractories Co., both of Philadelphia. Prices to be maintained are those in effect since Oct. 25, 1941. Price Administrator Leon Henderson said that the agreement will stabilize prices while OPA makes a study of the industry to determine fair maximum prices. The producers agreed to continue existing levels for a period of three months in which time OPA hopes to complete its study.



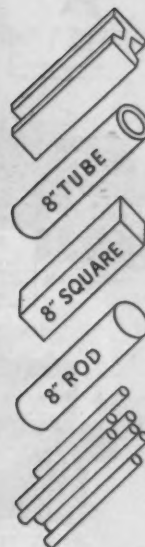
Request to Foundries

••• Foundries making non-ferrous castings were asked Feb. 2 by OPA to stabilize prices at levels which prevailed between Oct. 1-15, 1941. In the case of castings substantially different from those sold or offered for sale in that period, the foundries are asked not to exceed the prices they would have charged under the pricing formula they used Oct. 15. Data on sales, costs and profits must be furnished OPA by Feb. 15.

Deliveries completed before March 1 under contracts signed prior to Feb. 1 are exempt from the request. Foundries are requested

VERSATILITY *plus*

Now Built in three Sizes
No. 5—5' dia. round or 5' x 10' flat.
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No. 12—12' dia. round or 12' x 16' flat.
Also the No. 9 Upright Saw.



WELLS Metal Cutting Band Saws Accurately Handle a Variety of Jobs

Each day, even each hour, may bring a new and different job to the Wells Metal Cutting Band Saw—but each will be handled speedily, accurately, at the lowest cost. These dependable saws are

expertly engineered and are designed to do a wide variety of work. They are portable and can be quickly moved where needed. Learn today what Wells Saws can do for you.

WELLS MANUFACTURING CORP., Three Rivers, Michigan

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

INDUSTRIAL PERFORATIONS include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

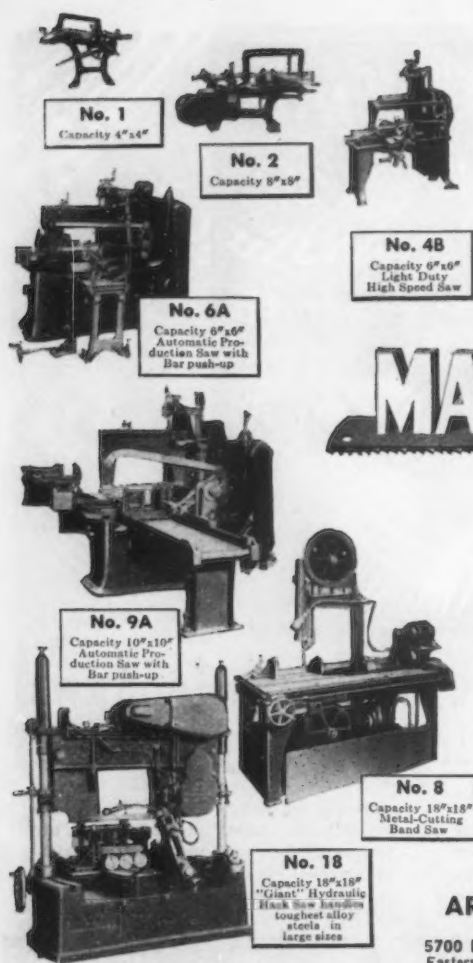
ORNAMENTAL PERFORATIONS as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

**Any Metal
Any Perforation**

H & K workmanship is unsurpassed.

The Harrington & King Co.
PERFORATING

5657 FILLMORE STREET—CHICAGO, ILL. New York Office, 114 Liberty Street



First
in Metal Sawing
Equipment

MARVEL SAWS

The Marvel System of Metal Sawing provides the most complete line of sawing machines built, including: the most widely used small shop saws (80% are MARVELS); the fastest high speed hack saws built, the most productive saws built (with automatic bar push-ups) the most versatile metal cutting saw—(a universal metal-cutting band saw); a Giant hydraulic hack saw that handles the largest and toughest bars and billets with ease; and the positively unbreakable MARVEL High-Speed-Edge Hack Saw Blades that permit any sawing machine to operate safely and continuously at full capacity.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Avenue Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York City

to sign an affirmation of compliance on or before March 15, June 15, Sept. 15 and Dec. 15. Applications for relief may be made to OPA.



Ceiling on Washing Machines

• • • Domestic washing machines and ironers are brought under a price ceiling at the manufacturers' level in Price Schedule 86, issued Feb. 2 and effective Feb. 9. Highest prices in effect between Oct. 1 and Oct. 15, 1941, become the maximums, except in the case of Apex Electrical Mfg. Co. which is allowed to charge prices as of Feb. 2.

An important feature of the new schedule is its restrictions placed on changes in specifications, except for non-substantial changes, and changes which do not reduce quality.



Casting Prices Stabilized

• • • Price Administrator Henderson has sent letters to non-ferrous foundries asking them not to charge prices for castings higher than those prevailing between Oct. 1 and 15, 1941. In the case of castings substantially different from those sold during that period, the foundries were requested not to exceed the prices which they would have charged under the pricing formula they used Oct. 15, taking the same cost factors and profit margins then in effect and ignoring any cost increases that may have occurred.

(Continued from P. 100C)

Second-Hand Tools Covered

• • • Sales and deliveries of second-hand machine tools will be more closely controlled under general preference order No. E-4 issued on Monday by WPB. The order makes all provisions of Priorities Regulation No. 1 apply to transactions in second-hand tools, just as those provisions apply to sales and deliveries of other merchandise. The WPB or persons authorized by him, may prohibit the sale of other disposal of any specific second-hand machine tools until further notice, under the order. In such instances the director will determine to whom a particu-

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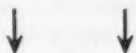
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lar tool should be allocated and an allocation order will be issued.



Tin Plate Coating Cut

••• The percentage of tin in a tin can, now 1.35 lb. per base box, was reduced by WPB on Tuesday to 1.25 lb. Specific authorization may be given for goods which require a heavier coating to avoid contamination. The order also sets up a quota system for tin plate, terne plate and long terne. Quotas have not yet been set.

Maritime Commission Plate Specifications Standardized

••• Standardization of plate sizes for construction of merchant ships, under the U. S. Maritime Commission shipbuilding program, has been at least partially worked out. The revised schedule has eliminated at least 100 weight specifications now on steel producers books, and has reduced the specifications to 25, ranging from 5.1 to 51.0 lb. per sq. ft. The new specifications are shown in the following table.

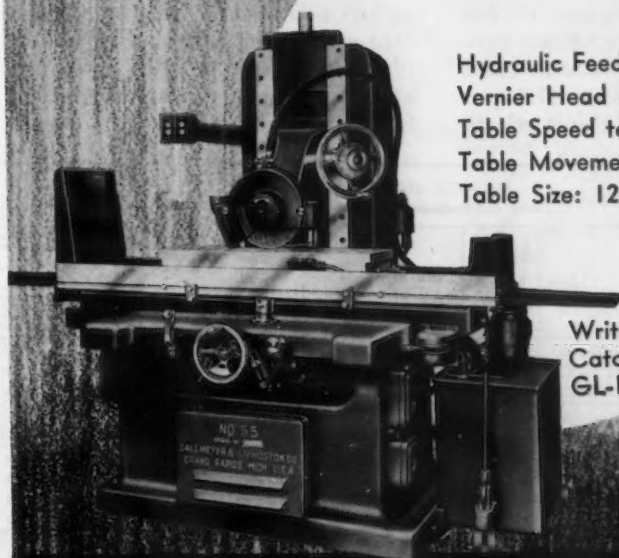
U. S. Maritime Commission Ship Plate Weight Schedule

Lb. per Sq. Ft.	Lb. per Sq. Ft.
5.1	21.675
7.6	22.95
8.925	24.225
10.2	25.5
11.475	26.775
12.75	28.05
14.025	29.32
15.3	30.6
16.575	33.15
17.85	35.7
19.125	40.8
20.4	45.9
	51.0

War Problems Topic of Tool Engineers' Meeting

••• Symposia on various aspects of wartime problems, such as conversion from peace to defense production, substitution of materials, conservation of cutting tools and problems relating to defense inspection, will feature the 10th annual meeting of the American Society of Tool Engineers, to be held at the Hotel Jefferson, St. Louis, Mar. 26, 27 and 28. Aircraft mass production, a topic of considerable interest due to the rapid development of the industry, will be another subject of discussion at one of the technical sessions.

GRAND RAPIDS PRECISION GRINDERS



Hydraulic Feed
Vernier Head Adjustment
Table Speed to 125 ft./min.
Table Movements: 13 1/2 x 38"
Table Size: 12 x 36"

Write for
Catalog
GL-100

GALLMEYER & LIVINGSTON CO.
200 STRAIGHT AVENUE, S.W. GRAND RAPIDS, MICHIGAN

CONTINENTAL SUPERIOR STEEL

Continental's policy is specialized service to all its customers. From Continental's plants at Kokomo, Canton and Indianapolis come steel wire and sheets in wide variety, made to specifications that cut production costs and make more salable products.

CONTINENTAL STEEL CORP., Kokomo, Indiana
(The Superior Sheet Steel Co., Canton, Ohio—a subsidiary)



CONTINENTAL

STEEL CORPORATION

SHEETS: Black, Galvanized, Coppered, Hot and Cold Rolled, Special Coated, Long Terno, etc.

WIRE: Bright Basic, KONIK, Coppered, Tinned, Specials, etc., also CHAIN LINK FENCE

Plate Output Rises to 133%; Sheet Production Declines to 80.1%

• • • Plate production in December rose to 635,812 tons, or to 132.6 per cent of capacity, while sheet output dropped to 905,980 tons or to 80.1 per cent, according to the American Iron and Steel Institute's monthly report of finished steel production. Plate production in November was at 122.8 per cent and sheets at 87.5 per cent. Total production for sale in

December was 5,527,210 tons, against 5,250,966 tons in November.

Tin plate production was still relatively the most active product, with hot rolled production rated at 105.4 per cent of capacity and cold rolled at 103.4 per cent. Black plate output in December was put at 201.7 per cent of capacity. Semi-finished steel production also

showed a gain, production of piling being put at 121.9 per cent of capacity in December, as compared with 79.3 per cent in the preceding month.

Due to war time censorship restrictions, the institute has ceased publication of certain data usually included in Form 10, including export production.

AMERICAN IRON AND STEEL INSTITUTE											
Capacity and Production for Sale of Iron and Steel Products											
December - 1941											
PRODUCTION FOR SALE—NET TONS											
	Number of companies	Items	Annual Capacity Net tons	Current Month				Year to Date			
				Total	Per cent of capacity	Shipments		Total	Per Cent of capacity	Shipments	
						Export *	To members of the industry for conversion into further finished products			Export *	To members of the industry for conversion into further finished products
STEEL PRODUCTS		Ingot, blooms, billets, slabs, sheet bars, etc.	42 1	611,921	xxx		173,635	6,925,892	xxx		2,078,405
		Heavy structural shapes	9 2	5,248,400	368,773	82.9		4,586,652	87.4		xxxxxx
		Steel piling	4 3	422,000	43,615	121.9		365,999	86.7		xxxxxx
		Plates—Sheared and Universal	20 4	5,654,360	635,812	132.6		7,031	6,027,001	106.6	40,466
		Skelp	8 5	xxxxxx	72,702	xxx		46,008	994,989	xxx	546,026
		Rails—Standard (over 60 lbs.)	4 6	3,613,600	131,263	42.9		1,708,464	47.3		xxxxxx
		Light (60 lbs. and under)	6 7	302,800	10,329	40.2		165,572	54.7		xxxxxx
		All other (Incl. girder, guard, etc.)	2 8	102,000	2,214	25.6		28,730	28.2		xxxxxx
		Splice bar and tie plates	15 9	1,312,200	44,832	40.3		675,735	51.5		xxxxxx
		Bars—Merchant	44 10	xxxxxx	557,446	xxx		67,700	6,425,670	xxx	752,174
		Concrete reinforcing—New billet	20 11	xxxxxx	149,011	xxx		xxxxxx	1,639,256	xxx	xxxxxx
		Re-rolling	20 12	xxxxxx	18,389	xxx		xxxxxx	253,095	xxx	xxxxxx
		Cold finished—Carbon	25 13	xxxxxx	105,224	xxx		xxxxxx	1,243,962	xxx	xxxxxx
		Alloy—Hot rolled	19 14	xxxxxx	168,273	xxx		32,517	1,903,758	xxx	283,079
		Cold finished	19 15	xxxxxx	19,916	xxx		xxxxxx	198,201	xxx	xxxxxx
		Hoops and baling bands	5 16	xxxxxx	7,342	xxx		xxxxxx	111,226	xxx	xxxxxx
		TOTAL BARS	68 17	13,354,925	1,025,601	90.6		100,217	11,775,168	88.2	1,035,253
		Tool steel bars (rolled and forged)	17 18	187,550	14,926	93.9		xxxxxx	153,953	82.1	xxxxxx
		Pipe and tube—B. W.	16 19	2,242,040	156,023	82.1		xxxxxx	1,768,253	78.9	xxxxxx
		L. W.	8 20	895,260	38,747	51.1		xxxxxx	485,270	54.2	xxxxxx
		Electric weld	7 21	1,071,020	57,247	63.1		xxxxxx	726,507	67.8	xxxxxx
		Seamless	15 22	2,997,160	186,880	73.6		xxxxxx	2,183,348	72.8	xxxxxx
		Conduit	8 23	174,140	13,486	91.4		xxxxxx	161,328	92.6	xxxxxx
		Mechanical Tubing	10 24	399,000	31,454	93.0		xxxxxx	350,172	87.8	xxxxxx
		Wire rods	22 25	xxxxxx	118,463	xxx		xxxxxx	1,495,945	xxx	248,316
		Wire—Drawn	41 26	2,293,490	190,354	97.9		2,440	2,307,623	100.6	23,112
		Nails and staples	18 27	1,153,930	57,647	58.9		xxxxxx	782,234	67.8	xxxxxx
		Barbed and twisted	16 28	474,210	28,383	60.7		xxxxxx	279,780	59.0	xxxxxx
		Woven wire fence	16 29	777,785	19,350	29.3		xxxxxx	296,506	38.1	xxxxxx
		Bale ties	11 30	110,970	5,468	58.1		xxxxxx	81,554	73.5	xxxxxx
		All other wire products	8 31	62,380	3,679	69.6		xxxxxx	39,118	62.7	xxxxxx
		Fence posts	13 32	122,165	4,581	44.2		xxxxxx	67,553	55.3	xxxxxx
		Black plate	11 33	340,030	58,152	201.7		78	474,433	139.5	175
		Tin plate—Hot rolled	7 34	515,620	46,060	105.4		xxxxxx	382,834	74.2	xxxxxx
		Cold reduced	11 35	3,658,540	320,706	103.4		xxxxxx	3,183,051	87.0	xxxxxx
		Sheets—Hot rolled	29 36	xxxxxx	551,121	xxx		16,579	7,466,687	xxx	201,744
		Galvanized	16 37	xxxxxx	100,532	xxx		xxxxxx	1,621,635	xxx	xxxxxx
		Cold rolled	18 38	xxxxxx	201,711	xxx		xxxxxx	3,024,960	xxx	xxxxxx
		All other	13 39	xxxxxx	52,616	xxx		xxxxxx	742,001	xxx	xxxxxx
		TOTAL SHEETS	31 40	13,347,160	905,980	80.1		16,579	12,855,283	96.3	201,744
		Strip—Hot rolled	25 41	3,291,430	152,963	54.8		18,362	2,013,436	61.2	245,212
		Cold rolled	40 42	1,553,110	105,719	80.3		xxxxxx	1,322,066	85.1	xxxxxx
		Wheels (car, rolled steel)	5 43	422,820	25,602	71.4		xxxxxx	268,165	63.4	xxxxxx
		Axles	7 44	453,470	20,371	53.0		xxxxxx	201,553	44.4	xxxxxx
		Track spikes	11 45	325,770	14,221	51.5		xxxxxx	171,113	52.5	xxxxxx
		All other	8 46	78,600	7,686	115.4		xxxxxx	56,408	71.8	xxxxxx
		TOTAL STEEL PRODUCTS	171 47	xxxxxx	5,527,210	xxx		382,814	65,361,688	xxx	4,418,709
IRON PRODUCTS		Pig iron, ferro manganese and spiegel	31 48	xxxxxx	754,211	xxx		303,870	8,190,933	xxx	2,846,174
		Ingot moulds	5 49	xxxxxx	77,456	xxx		xxxxxx	821,230	xxx	xxxxxx
		Bars	13 50	xxxxxx	175,915	10,221	68.5	675	102,924	58.5	6,008
		Pipe and tubes	3 51	xxxxxx	109,300	6,969	73.2	xxxxxx	71,152	65.1	xxxxxx
		All other	2 52	xxxxxx	71,000	2,286	38.0	-	22,993	32.4	-
		TOTAL IRON PRODUCTS (ITEMS 50 to 52)	15 53	xxxxxx	291,715	19,476	78.8	675	197,069	67.6	6,008

Total Number of Companies Included - 196.

During 1940, The Companies Included Above Represented 98.0% of the Total Output of Finished Rolled Products.

* In accordance with Government Policy, Export Figures Cannot Be Published.

PERSONALS

• **N. C. Ferreri** has been made vice-president in charge of sales of Auburn Central Mfg. Corp., Connersville, Ind. Mr. Ferreri was formerly connected with Truscon Steel Co. in Youngstown. Moving to Cleveland, he became manager of equipment sales of its pressed steel division. He joined Auburn Central Mfg. Corp. as general sales manager in February, 1941.

• **J. G. Green** has been made assistant general manager of the Storage Battery division of Philco Corp., Philadelphia. Following his graduation from Pennsylvania State College, where he specialized in electrical engineering, Mr. Green was connected with the Westinghouse Electric & Mfg. Co. for 11 years. He first served with the railway equipment engineering department and, later, as manager of industrial sales in the Pittsburgh office which included parts of Pennsylvania, Ohio and West Virginia. In 1935 Mr. Green established the J. G. Green Co. in Pittsburgh to provide engineering services and to act as manufacturers' agents. Since January, 1940, Mr. Green has been assistant sales manager of the Louis Allis Co. in Milwaukee.

• **George M. Snodgrass** has been named manager of the Eastern Sales division of the Sawyer Electrical Mfg. Co., Los Angeles, headquarters for which will be at 2110 Terminal Tower, Cleveland. Before his recent appointment as Sawyer division manager, Mr. Snodgrass was vice-president and sales manager of the Imperial Electric Co., Akron, Ohio. Prior to that, he had been sales manager of the electrical division of Fairbanks, Morse & Co.

• **Martin Fladoes** has been elected president of the Sivy Steel Castings Co., of Milwaukee, to succeed the late L. S. Perego. Mr. Fladoes went to Sivy as an apprentice in 1920 and soon entered the office, where in 1926 he was made a salesman and in 1927 sales manager. He became vice-president in charge of sales when Sivy acquired the Nugent Steel Casting Co., Chicago, having three years previously been appointed a director. **Harold L. Holtz**, a vice-presi-



N. C. FERRERI, vice-president in charge of sales, Auburn Central Mfg. Corp., Connersville, Ind.

dent of Sivy, was elected to the board of directors.

• **Eddie Molloy**, works manager of Ryan Aeronautical Co., San Diego, has been elected vice-president in charge of manufacturing for the company. Mr. Molloy joined the Ryan organization about a year and a half ago after 14 years with the Curtiss-Wright Corp. of which he was assistant chief engineer up to 1939.



J. G. GREEN, assistant general manager of the Storage Battery division of the Philco Corp., Philadelphia.

• **J. D. McKnight** has been made assistant district manager, Allegheny Ludlum Steel Corp.'s Detroit office. Mr. McKnight has had six years of sales experience with Allegheny Ludlum, having started in 1936 in the Detroit office of the former Allegheny Steel Co. Prior to that time Mr. McKnight had been connected with the Murray Corp. of America, Detroit, in various plant and sales capacities.

• **Dr. Robert Beer**, for 22 years works manager for the Osram Lamp Works in Vienna, has joined the engineering department of the Save Electric Corp., Toledo, Ohio, for the dual purpose of enlarging both quality inspection and research departments. During the interim between leaving Austria and reaching the United States, Dr. Beer spent one year and a half in Stockholm, Sweden, where he was employed in the Luma Lamp Works as a consultant.

• **R. Calvert Haws**, for the past year an account executive with the McCarty Co., of Los Angeles, has joined the Western Precipitation Corp., Los Angeles, to assist Richard F. O'Mara, sales manager, in advertising and sales promotion. Mr. Haws was formerly with Henri Hurst & McDonald, and head of his own agency in Chicago.

• **F. D. Carroll** has been appointed district sales manager of the Dallas territory of the Youngstown Sheet & Tube Co., with headquarters at 610 Continental Building, Dallas, Texas.

• **Homer L. Shaw** has been appointed a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to research in metallurgy. A graduate of Muskingum College, Mr. Shaw was associated with the Jones & Laughlin Steel Corp., Aliquippa, Pa., prior to joining the Battelle staff.

• **F. P. McKegney**, formerly assistant chief engineer of the Air Reduction Co., New York, has been appointed chief engineer.

• **T. D. Hudson** has been appointed assistant purchasing agent of American Steel & Wire Co., Pittsburgh, under Frank E. Chesney. He was formerly purchasing agent and assistant auditor of the Pittsburgh-Conneaut Dock Co.,

Conneaut, Ohio, with which he became associated 26 years ago and of which he is a director, as well as a director of Pennsylvania-Lake Erie Dock Co. All of these companies are subsidiaries of the U. S. Steel Corp.

- **Justice Fleischmann**, formerly a member of the Buffalo law firm of Fleischmann Brothers, has joined the Curtiss-Wright Corp.'s airplane division as assistant to William J. Crosswell, director of military contracts.

- **William H. Klett**, who has had many years experience with the Spanish speaking peoples, has been put in direct charge of the Latin American business of the Marmon-Herrington Co., Indianapolis, Ind.

- **Milan Freese**, formerly of the sales promotion department of the Ohio Seamless Tube Company, Shelby, Ohio, has been named advertising manager of the Seamless Tube Co.

- **Bennett Burgoon, Jr.**, has been appointed representative for McKenna Metals Co. at Rockford, Ill., following his resignation as mechanical engineer of the Railway Steel Spring division of the American Locomotive Co., Latrobe, Pennsylvania.

- **Lawrence D. Bell**, president of the Bell Aircraft Corp. of Buffalo and Niagara Falls, has been appointed a director-at-large of the National Association of Manufacturers by President William P. Witherow.

- **E. K. Waldschmidt**, formerly metallurgical contact man, Jones & Laughlin Steel Corp., Pittsburgh, has joined the cold finished sales department of that company. Previous to metallurgical contact work, Mr. Waldschmidt was assistant metallurgist, Pittsburgh works, Jones & Laughlin, and for the past several years has been intimately associated with metallurgical work, both from the standpoint of plant operations as well as customer problems.

- **Roger M. Blough** has been named as general solicitor in charge of all legal matters for United States Steel Corp. of Delaware, Pittsburgh. Mr. Blough succeeds the late William Beye, who died Oct. 27, 1941. The appointment is effective immediately. Mr.

Blough has been engaged in general practice of law with White & Case in New York City since 1931. When the Temporary National Economic Committee investigated the steel industry in 1939 and 1940, Mr. Blough acted as an associate counsel for the United States Steel Corp. in connection with that investigation.

- **John A. Bigelow** has been appointed plant protection engineer of Wickwire Spencer Steel Co., New York. Before joining Wickwire Spencer, Mr. Bigelow represented a branch of the graphic arts serving a wide variety of in-

dustrial accounts. Mr. Bigelow will supervise protection of the company's seven plants located in Buffalo, Worcester, Clinton and Palmer, Mass.; Mt. Wolf, Pa., and Blue Island, Ill., including the maintenance of employment records and employee identification.

- **Dr. C. F. Rassweiler**, who joined Johns-Manville last June as director of research, was appointed a vice-president of Johns-Manville Corp., New York.

- **J. P. Henry** has been made New England representative of Ampco Metal, Inc., Milwaukee, with offices at 410 Asylum Street, Hartford.

Aluminum Scrap Conservation

(CONTINUED FROM PAGE 51)

and somewhat similar results can also be achieved by mixtures of chlorides and fluorides alone, without the presence of cryolite.

The use of volatile fluxes such as zinc chloride and sal ammoniac is of advantage at the end of the puddling process, previously mentioned, but melting aluminum scrap sheet, punchings, etc., with these fluxes without constant stirring gives very low recoveries. A flux consisting of 85 per cent common salt and 15 per cent fluorspar has been found most useful when used in large proportions (20 to 25 per cent of the weight of sheet cuttings or punchings) and when mixed with the scrap before charging and heated in crucibles until the flux is fairly fluid.

With clean cuttings this method does not give higher results than the puddling process, but it is preferable because constant stirring is not required, labor costs thus being less. Much higher temperatures are required by this method than by the puddling method. The melting is best done in plumbago crucibles or in a reverberatory furnace.

If cuttings are melted in pit fires the flux method is best; if iron-pot furnaces are employed the puddling process is most suitable. Experience shows that if the iron pots are kept well coated with a thin clay wash or graphite mixture, one part by volume of graphite in two parts of water, they are perfectly satisfactory to use when melting scrap aluminum.

Since the presence of dirt, oxide, oil, and moisture causes low recoveries, the necessity for care and cleanliness in the collection and

storage of aluminum scrap cannot be too strongly emphasized. The scrap should be kept free from brass, zinc, shop sweepings, and other foreign matter, and especially from white metal or lead. Wet scrap should be dried by centrifuging or other means as soon after machining or washing as possible to avoid oxidation or corrosion of the metal.

The recoveries shown here are based on the total weights of the different kinds of aluminum scrap handled. Recoveries on scrap aluminum castings vary from about 80 per cent to as high as 95 per cent, the variation depending upon the amount of grease, dirt, and other foreign matter present. Yields in remelting painted aluminum, such as railway passenger coach panelling sheet, may vary from 80 to 87 per cent. The recovery in running down discarded or used sheet may vary from 83 to 95 per cent. Recoveries in remelting old sheet and cuttings in the loose condition may be expected to average possibly 3 per cent less than when baled.

Great care is necessary when melting down aluminum scrap to avoid overheating, and too much emphasis cannot be laid on this point, especially where the melter has been accustomed to melting brass or iron. Very low recovery may arise from careless overheating. Since all the metal is urgently needed for construction of aircraft, it is a matter of vital importance to reclaim all aluminum scrap and to obtain high percentage recoveries.

Acetylene Association Offers Book on Welding

••• A new book prepared primarily to assist instructors in planning courses for the training of oxy-acetylene welding and cutting operators has just been published by the International Acetylene Association. The book, "Training Oxy-Acetylene Welding and Cutting Operators—Instructors Outlines," is divided into three chapters. The first outlines the essential information that should be presented in a course for the training of a general welding operator, an aircraft welding operator, and a pipe welding operator. The second chapter contains in outline form the material essential to the training of various types of cutting operators. The third chapter outlines the essential information that should be given in a course for inspectors.

The material presented throughout the book has been divided into self-contained units, each of which includes the four essential parts of any particular lesson, namely, an outline for a classroom lecture, suggestions for study assignments, recommendations for the material that should be demonstrated and discussed, and a description of practice exercises for the student.

Copies of this new 88-page book can be obtained by writing to the secretary of the International Acetylene Association, 30 East 42nd Street, New York. Paper-bound copies are 25 cents each; cloth bound, 75 cents.

"Dim-Outs" Advocated Instead of Blackouts

Pittsburgh

••• Permanent blackouts for large cities would require millions of dollars and weeks of preparation and in the end would not prevent bombers from locating the approximate centers of the cities, S. G. Hibben, Westinghouse lighting expert told illuminating engineers here last week when he advocated instead "dim-outs."

"Dim-out" calls for extinguishing of lights in and around major targets and strategic land marks, leaving sufficient street and traffic lighting for essential activities, Mr. Hibben said.

Lights in apartment houses and

Weekly Bookings of Construction Steel in Tons

Week Ended	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1941	Year to Date	
					1942	1941
Fabricated structural steel awards	22,600	28,850	16,200	30,450	144,650	204,050
Fabricated plate awards	300	890	0	4,930	3,690	19,845
Sheet steel piling awards	690	100	0	295	790	4,250
Reinforcing bar awards	24,925	41,400	62,000	11,350	211,525	51,020
Total letting of Construction Steel	48,515	71,240	78,200	47,025	360,655	279,165

ordinary office buildings could be concealed simply by drawing shades or blinds, he added. Partial leakage of light would not be serious since it would reveal no distinctive pattern from the air.

Using Pittsburgh as an example, Mr. Hibben advocated putting out the lights in the tallest of downtown buildings, on the bridges, and on other land marks as soon as air raid warnings are sounded, but certain lights on side streets and some through highways might remain on for essential traffic. One street light for each city block would break up any identifiable map pattern, he said.

Cast Iron Pipe

• Navy Department has awarded 5200 ft. of 8-in. pipe for Newport, R. I., torpedo station to Warren Pipe & Foundry Co., Boston.

Woonsocket, R. I., has awarded 600 tons of 6 to 10-in. pipe to Chain Construction Co., which will sublet contract.

Ogden, Kan., will close bids on or about Feb. 12 for water system; also for pumping equipment and accessories. Wilson & Co., Public Utilities Building, Salina, Kan., are consulting engineers.

Pasadena, Tex., has voted bonds for \$250,000 to supplement federal appropriation of \$332,700, making total fund of \$582,700 for pipe line extensions and replacements in water system, elevated steel tank and tower, and other waterworks installation. Part of fund will be used for extensions and improvements in sewage system, including sewage disposal works.

Water Department, Shreveport, La., plans expansion and improvements in water system, including new 20-in. line over Red River for main supply, and extensions in pipe lines in main city district. Cost about \$180,000.

Department of Public Utilities, Division of Water and Heat, City Hall, Cleveland, William D. Young, director, plans waterworks program including new 48 and 24-in. main supply lines from Ivanhoe Road and St. Clair Avenue to East 222nd Street, cost about \$430,000; 36-in. main line from West 105th Street to Bellaire and Brookpark Roads, including lines on Park Street and Tiedeman Road, cost \$443,000; 48-in. main line from Fairmount Station to Chardon Road, about eight miles; two new main lines to Warrensville Center Road, comprising section south of Kinsman Road, about

\$215,000; new pipe line from point near Broadway and Turney Road to Garfield Heights district, \$225,000; and several new pipe lines in main city area and industrial districts for fire-protection system, cost over \$1,200,000. Project will include new pumping unit and auxiliary equipment at Kirtland waterworks station, with rating of 75,000,000 gal. per day, to cost about \$225,000; and similar expansion at main division pumping plant, including pumping machinery with capacity of 40,000,000 gal. per day and accessory equipment, estimated at \$525,000. Part of fund is available for project, remainder to be financed through federal aid.

Pipe Lines

• Gulf Refining Co., 1530 Commor Street, Detroit, plans new welded steel pipe line from natural gas properties at Bateson, near Kaw-kawlin (Bay County) to Midland, Mich., about 16 miles, for gas transmission to plant of Dow Chemical Co. at latter place. Estimates of cost will be secured at once. Negotiations are under way with Dow company for gas requirements.

Texas Pipe Line Co., Salem, Ill., affiliated with Texas Co., 720 San Jacinto Street, Houston, Tex., plans extensions in welded steel pipe lines in parts of Hamilton, Jefferson and neighboring counties, Ill., for crude oil transmission. Main offices are at Houston address.

Naval Supply Depot, Navy Department, Norfolk, Va., asks bids until Feb. 10 for 14,000 ft. of 3/4-in. inside diameter black seamless or welded steel pipe (Schedule 5160).

Shell Oil Co., Shell Building, Houston, Tex., plans new 4 to 8-in. welded steel pipe line from point near Wichita Falls, Tex., to Antelope (Jack County), Tex., close to 60 miles, for crude oil transmission. Connection will be made with main pipe line system in Wichita Falls area. Work will be carried out by Shell Pipe Line Co., first noted address.

General Purchasing Officer, Panama Canal, closes bids Feb. 13 for 1200 ft. of steel pipe; also for 5000 ft. of 8-in. cement-lined cast iron water pipe and cast iron water pipe sleeves (Schedule 5958).

Sinclair Refining Co., 840 South Lamar Street, Dallas, Tex., plans new 6-in. welded steel pipe line from Chapel Hill gas field (Smith County), Tex., to point near Hawkins, Tex., about 50 miles, for natural gas transmission. Work will be carried out in conjunction with new wells to be drilled in Chapel Hill area, with installation of a pipe line gathering system in that field, with booster station and other facilities. Entire project will cost over \$300,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 20 for quantity of steel pipe and steel tubing for Portsmouth, N. H., and Mare Island, Vallejo, Cal., navy yards (Schedule 316).

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

Many Auxiliary Machines Not Under Price Ceiling

Cleveland

... Machine tool observers have been rather amused with the confines of the OPA price limitation placed upon machine tools identified as "all machines for the cutting, abrading, shaping and forming of metals, including presses." On the basis of this definition it would appear that manufacturers of plating equipment, cranes, washing or degreasing machines, induction heating apparatus assembly machines, furnaces and even machines to be used for work on non-metallic substances such as plastics, are to be excluded from the OPA's so-called "machine tool price ceiling." The common opinion is that if the OPA did mean to include this group, it would appear that some clarification of the original order might be forthcoming.

A large wave of buying on shell-making equipment appears to have somewhat subsided for the time being and is now being replaced by heavy buying of machine tools to be used in the manufacture of airplane equipment and tanks. In important demand are milling machines, planers and boring mills.

Among important aircraft parts companies mentioned as expanding further are the Leece-Neville Co., Parker Appliance Co., Reliance Electric & Engineering Co., Jack & Heintz and White Motor Co. There are also unconfirmed rumors that Thompson Aircraft Products may enlarge its capacity even further in the near future. This tremendous demand for equipment and the necessity for its servicing are placing heavy strains upon the entire industry.

The demand for bomb spinners is expanding steadily and facilities to turn these out are being enlarged.

The growing percentage of war work being handled by important plants allied with the machine tool industry is indicated by the increasing number of concerns who have received the Navy "E" award. To this list, now numbering about 67, have been added the names of

Steel Improvement & Forge Co., and Warner & Swasey Co., who thus far are the only two companies who have received this award in Cleveland.

Personnel Shortages Felt

Cincinnati

... Most machine tool builders in this area are busy adjusting their plants to the adoption of a seven-day production schedule, which had been approved a week ago at a meeting of Cincinnati industrialists. While most plants had reached some sort of seven-day production prior to the adoption of this new schedule, primarily where bottlenecks appeared, it is now becoming general to run full. The general feeling in the trade, however, is that a full three-shift day is well nigh impossible since the plants cannot obtain sufficient personnel at the moment. Nevertheless, training programs are being pressed hard in an effort to man full three shifts per day. A second problem naturally arises from the tightness of material, but manufacturers indicate that this is not as crippling as the personnel problem. With new business continuing in an ever brisk manner, very little change in backlogs is noted. In a few instances, they are a trifle bigger than heretofore.

Midwest Becoming Shell Center

Chicago

... Orders are heavier with some armament plants, such as Buick Aviation, buying strongly to meet stepped-up production quotas and many others coming in with new contracts, principally in the shell and cartridge field. The Midwestern area, if not now, will soon be the nation's center for the manufacture of shells.

Though the armed forces seem pleased with many of the methods employed by shell contractors, several of the leading ones have told THE IRON AGE that they are not at all satisfied with their own methods. One of the largest shell makers in this area, who has been publicly praised for his methods, states privately that he would not

recommend his procedure to others. Exactly the same thing has been repeated in other cases. And the reasons are: (1) no one, including the arsenals, seems able to recommend the best procedure; (2) machine tools aren't available; and (3) shell contractors have almost all been forced to devise their own set-ups. Though many are producing shells in quantity, too many feel that they could be turning out a lot of more, faster and cheaper, if they did not have to depend on "hit-or-miss" methods.

Machine tool price ceilings have been greeted quietly here, although some feel that costs may get out of balance. With demands for new equipment so great in this rapidly growing armament section, all machine tool builders have little thought for anything save production.

Simmons Machine Tool Co. Forms New Tool Division

Albany, N. Y.

... Because the company is devoting more and more of its effort to building new machine tools, the Simmons Machine Tool Corp., one of the largest rebuilders of metal working machinery, last week announced the formation of a New Machine Tool division. Charles A. Simmons, Jr., executive vice-president and general manager, will direct the operation of this division, with B. A. Getz as his assistant in charge of sales. Mr. Getz joined the organization four years ago upon leaving the Sidney Machine Tool Co.

Recently the company announced the addition of a new 6-in. horizontal boring and facing machine to its line of new machines. It also builds 48- and 54-in. heavy duty engine lathes, a No. 2 turret lathe, a No. 1-A plain milling machine and a line of standard and gap bed lathes.

L. W. Rolfe, manager of the New York office, has been transferred to Albany where he will assist in the operation of the rebuilding division. William C. Werley has been transferred from the Philadelphia territory to manage the New York office.

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

February Zinc Pool

Requirements 40%

••• Slab zinc producers were somewhat surprised this week at the low pool requirements, set at 40 per cent of November production, up 9 per cent over January's requirements but about 10 per cent less than originally expected. The zinc oxide pool for February is doubled from 10 per cent in January to 20 per cent of November production, and there are no requirements for zinc dust.

Confirmation of zinc prices that have prevailed since Oct. 9, 1941, was made this week by the OPA formal Price Schedule No. 81. Continued reports of dealers' sales in excess of the agreed maximums were blamed by OPA for the issuance of a formal order. The new schedule is shown in detail on page 92.

An agreement has been signed with Chile giving the United States exclusive buying rights on all strategic minerals, including zinc and lead. The contract is with MRC, and will extend 18 months. This is in line with the copper agreement announced in THE IRON AGE, Jan. 29. Further information on the copper agreement indicates that 66,000 tons of concentrates and 99,000 tons of ores will be delivered to this country on the price basis of 11.75c. a lb., copper content. Ores and concentrates in these quantities will equal about 25,500 tons of refined copper. This is in addition to the shipments of South American refined copper, which have been running between 35,000 and 40,000 tons a month.

The zinc industry is in approval with the plan to separate the units in the copper-zinc section of the former OPM set-up. There is believed to be a distinct advantage in having the zinc section entirely on its own, and David A. Uebelacker, former chief of the copper-zinc section, will head the independent zinc branch.

Maximum prices for brass and bronze ingots, effective Feb. 1, were established in line with the agreement made public on Jan. 2. A few minor adjustments were made, but in general the ingot

price level was left unchanged.

The Phelps Dodge Corp. open pit copper mine went into operation this week after 4½ years under construction. Two ball mills in the concentrator were operating, and other units of the \$35,000,000 project will be working as soon as possible. Capacity operation will result in the refinement of 75,000 tons of copper a year, handling 25,000 tons of ore a day. The DPC has proposed a \$28,000,000 expansion for the mine to increase output 80 per cent, in an effort to more quickly tap the 230,000,000 ton ore body.

Alternate temporary choices on prices for lead products and alloys were granted producers by OPA, permitting them to hold to their Jan. 2 prices or to charge no higher than their maximum of April 1, 1941, plus 0.65c. a lb. If both of these alternatives work hardship on the producer, open selling is permitted provided writ-

ten notification is given OPA of agreement to make final billing at prices not to exceed the maximums which will be announced.

Electrolytic tin plate is finally coming into its own in a big way. The U. S. Steel Corp. is installing three lines, one each at the Gary, Chicago, and Birmingham plants; Bethlehem is building two lines at Sparrows Point; Inland is building one at the Indiana Harbor works, and several other producers are considering this addition to their facilities in an effort to save tin. It was recently estimated that this method of plating will save as much as 1 lb. on every 100 lb. of tin used, possibly more.

Average prices of major non-ferrous metals during January are as follows:

	Cents per lb.
Electrolytic copper, Connecticut Valley	12.00
Lake copper, Eastern delivery	12.00
Straits tin, spot, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Lead, St. Louis	6.11
Lead, New York	6.26

SIS TAKES OVER: Before Walter Caldwell, Jr., leaves for Pearl Harbor as an expert machinist, he is teaching his sister, Mae, how to run his engine lathe in the American Gear & Mfg. Co. plant in Chicago. The company has hired 20 girls to replace enlistees on machine jobs.

AP Photo



Steel Companies Embark on Deals for Auto Yards

... Steel company labor gangs have been moving into auto graveyards during the past week and expediting the movement of scrap needed by open hearths. This new practice has been developing quickly and arises from mills' desperation over the auto graveyard scrap problem, long a source of argument.

At least five steel companies in the Middle West and one in the East have embarked on auto wrecking recently. Several methods of procedure are followed:

Under one method, the auto wrecking company is approached and offered a price for existing old cars. The steel company then moves in its labor gang which in some cases involves men whose wage rate is as high as 90c. per hour. While the cars are being wrecked the owner of the wrecking company is allowed to specify which parts he wants set aside for his use and sale. Usually the motors, front and rear axles and smaller parts are reserved by the owner of the yard.

A rough estimate indicates the mill salvages and takes possession of about 75 per cent of its total purchases. It is estimated two men may wreck up to 10 cars per day.

Adding the various wage costs, hauling costs and yard conversion with no profit to the agent acting for the steel company, in some cases brings a net price of \$2 or more above the fixed maximum ceiling price but it is claimed by some authorities that the formal ceiling on iron and steel scrap does not completely cover transactions of this sort.

In some cases the prices realized by auto graveyard owners from steel companies are understood to be \$15 to \$16 per gross ton. The greater portion of the 75 per cent scrap return which the steel company gets is sheet steel.

Interference by CIO officials with the collection and shipments

of scrap and inability to get 500,000 tons of scrap out of coal mines because the union refuses to adjust overtime rates, was charged by E. C. Barringer, executive secretary of the Institute of Scrap Iron & Steel, Inc., last week in a sharply worded reply to SWOC Chairman Philip Murray, who sought to blame scrap dealers and steel mill executives for most of the ills of the war program. Barringer pointed out that "sworn testimony last week before the Congressional Committee on Small Business definitely refutes Mr. Murray's charge that scrap interests are endangering the war program to gain further profits."

Scrap Price Schedule Revised by OPA

... Iron and steel scrap price schedule No. 4 was amended by OPA Tuesday with respect to prices of borings, New England shipping point prices, dockage charges, unprepared scrap, transportation charges for truck delivery, railroad scrap and scrap definitions.

Among the points modified were: (1) Borings for chemical use in the manufacture of explosives are priced at \$5 per gross ton higher than the maximum price for cast iron borings. For all other borings used chemically the maximum price is \$3 higher per gross ton than cast iron borings;

(2) Maximum shipping point prices in New England are to be computed in the future from prices from the most favorable basing point. Consumers need not pay more than \$6.27 per gross ton transportation charges on scrap shipped from any New England point.

(3) Established dock charges figuring in shipping point prices where vessels are employed are no longer to be used. Instead the charges per gross ton are to be 50c. at Memphis, \$1 at Great Lakes ports, \$1.25 at New England ports and 75c. at all other ports.

Much Scrap Still Untouched, Asserts Auto Yard Expert

Akron, Ohio

... "It is a disgrace to this country to have to resort to house-to-house collections, which, in effect, are a source of comfort to our enemies in indicating to them an insufficiency of raw materials, when in actual fact there is plenty of scrap in this country," was the opinion given to THE IRON AGE by Bernard Silverman, member of the S. J. S. Scrap Iron & Metal Co. with plants in Brooklyn, N. Y., and Akron, Ohio. He estimated there are probably 2,000,000 tons of potential scrap in second hand auto yards in Ohio, Pennsylvania, New Jersey and New York.

Mr. Silverman buys up the cars in the yards of second-hand auto dealers, and then dismantles them and sells the scrap through scrap dealers, while the spare parts which can be salvaged are handled through an Akron outlet.

Silverman doubts that the blanket scrapping of cars older than, say, 1932 or 1933 models, is a wise policy, since various types of earlier styles of cars are more valuable in some cases than even 1935 models. He does not hold with the excuse offered by many auto wreckers for not junking many of their cars, i.e., that if they did so they would be virtually out of business, because he has repeatedly purchased the entire stock of certain yard operators who have actually continued in business even immediately following the sale of their entire stock. He feels that many of the cars in second-hand yards have no value whatsoever except as scrap, and that the owners of these cars hesitate to scrap them in the hope for higher prices. Federal compulsion exercised against yard owners, he says, would yield millions of tons of scrap with the aid of experts who can distinguish a scrap type car from an auto having potential value.

About 90 per cent of the spare parts held in stock at these yards

have no more value than the price of scrap metal, he said, citing specific examples that might yield substantial scrap, such as one dealer who has 8,000 cars in his yard and 1,000 tons of springs, and a second-hand truck dealer in the Cleveland district who has about 200 tons of wheels alone, aside from other scrap tonnages owned at these yards.

At present Mr. Silverman is facing competition from steel mills, one of whom he reports has bought out two second-hand car yards, one at Butler, Pa., and the other at Irwin, Pa., at the unusually high price of \$14 per net ton. This mill has agreed to dismantle the cars, save the parts and tires for the second-hand dealer and even haul it away. On this basis Mr. Silverman estimates that the \$14 net ton price, which would be equivalent to \$15.68 a gross ton, plus an average of \$3 for cutting, \$3 for hauling by truck and \$2 for burning and cleaning, would result in a total price of \$23.68 per gross ton, exceeding the OPA price limitations. Moreover, it is important to take into consideration the fact that these figures do not include an allowance for the value of parts left with the dealer, who may be able to get the motor, the rear end springs, and transmission, all of which would have values ranging anywhere from \$2 to \$8 per car on a conservative basis.

District Scrap Markets

PITTSBURGH—The amount of tin can scrap which is being consumed by open hearth furnaces throughout the country is without doubt substantially greater than the admissions from brokers and consumers would indicate. The disinclination to admit the use of tin can scrap is based upon the general belief that the small amounts of tin would be injurious to the steel quality. It is known, however, that in any case where tin can scrap is used the amount is closely controlled and the products in which this type of material goes are also specifically restricted.

DETROIT—Drastic scrap shortages are forcing the second major producer in the Detroit area to take open hearth out of production this week. Allocations of scrap have merely served so far to shift the shortages from one plant to another. The producer faced by shortages this time is Ford Motor Co. which had all furnaces producing early in the week but did not have enough scrap to continue production on that basis. It was an-



PHOTOS OFFERED AS EVIDENCE: At intervals the government has been taking pictures of scrap yard piles in an attempt to prove that scrap has not been moving. These pictures were among a series shown to the Patman Small Business Committee at Washington. The scrap industry regards the photos as decidedly unfair as in most cases the materials shown were unprepared scrap and in most cases there were good individual reasons why it had not been prepared.

nounced that, probably on Wednesday, Ford would take two furnaces out of production. Meanwhile, Great Lakes Steel Corp. had all furnaces operating but on an inefficient basis because of the scrap situation.

BUFFALO—Scrap receipts are not particularly good, but have not fallen off nearly as much as had been feared a few months ago. A few small allocations have been made recently.

BIRMINGHAM—Following governmental warning of possible requisitions, auto wreckers have been advised by some unofficial quarters to dispose of all unsalable automobiles for scrap. One authority estimates old model automobiles in scrap yards in the Birmingham area

would produce at least 1500 to 2000 tons of scrap.

TORONTO—The slight flurry that appeared in scrap offerings a week ago has disappeared and dealers again are doing a lot of scraping to meet consumers' demands. There is some talk of gathering tin cans for scrap, but so far neither dealers nor mill interests have shown any enthusiasm.

BOSTON—The movement of materials has not increased to any great extent despite activities of the price administration office. The future is problematical. Yards are still not satisfied with prices for certain materials, particularly cast, and with shipping rules. They claim amounts allowable for preparing scrap for consumers are inadequate.

SCRAP PRICES

Revised to Dec. 23, 1941

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; No. 2 Bundles; Cast No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt. ...	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.....	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.....	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind..	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.....	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.....	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio.....	17.50	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.....	17.50	13.50	13.50	22.50	22.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.....	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.....	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.....	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of South San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are taken for purposes of deducting. For exceptions see official order.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap."

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Re-rolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington.	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco.....	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Stove plate.....	14.00	15.00	16.00
Heavy breakable cast.....	16.50	17.50	18.50
Charging box size cast.....	17.25	18.25	19.25

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

... Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00

Wire and Wire Products: (Cents Per Lb.)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1942
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1941
No. 2 fdy., Philadelphia...	\$25.84	\$25.84	\$25.84	\$25.84
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.06	24.06	24.06	24.06
No. 2 Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.34	25.34	25.34	25.34
Basic, Valley furnace ...	23.50	23.50	23.50	23.50
Malleable, Chicago† ...	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago ..	31.34	31.34	31.34	30.34
Ferromanganese†	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.

Scrap: (Per Gross Ton)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1941
Heavy melt'g steel, P'gh...	\$20.00	\$20.00	\$20.00	\$21.25
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.25
No. 1 hy. comp sheet, Det.	17.85	17.85	17.85	17.75
Low phos. plate Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh...	22.00	22.00	22.00	22.25
No. 1 cast, Philadelphia...	24.00	24.00	24.00	23.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	18.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1941
Furnace coke, prompt...	\$6.125	\$6.125	\$6.125	\$5.50
Foundry coke, prompt...	6.875	6.875	6.875	5.75

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Feb. 3, 1942	Jan. 27, 1942	Jan. 6, 1942	Feb. 4, 1941
Copper, electro, Conn.*...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	50.375
Zinc, East St. Louis.....	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	5.70	5.34
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 134 to 140 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

... Composite Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Feb. 3, 1942	2.30467c. a Lb.....	.....\$23.61	a Gross Ton.....	.....\$19.17	a Gross Ton.....
One week ago	2.30467c. a Lb.....	.....\$23.61	a Gross Ton.....	.....\$19.17	a Gross Ton.....
One month ago	2.30467c. a Lb.....	.....\$23.61	a Gross Ton.....	.....\$19.17	a Gross Ton.....
One year ago	2.30467c. a Lb.....	.....\$23.45	a Gross Ton.....	.....\$20.17	a Gross Ton.....

High		Low		High		Low		High		Low	
1941.....	2.30467c.,	2.30467c.,		\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10				
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16		23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9				
1939.....	2.35367c., Jan. 3	2.26689c., May 16		22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16				
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18		23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7				
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10				
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9				
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8		18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29				
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2		17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25				
1933.....	1.95578c., Oct. 3	1.75836c., May 2		16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3				
1932.....	1.89196c., July 5	1.83901c., Mar. 1		14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5				
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29				
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9				
1929.....	2.31773c., May 28	2.26498c., Oct. 29		18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3				

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	DELIVERED TO														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									-4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢					2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			3.37¢
TERNES, M'FG.															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
									(Coatesville and Claymont = 2.10¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS¹²															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ¹³ Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 12 in.....\$52.00
12 in. to 18 in..... 54.00
18 in. and over..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) Per Lb.
Pittsburgh, Chicago, Cleveland. 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem\$54.00

TOOL STEEL

(F.o.b. Pittsburgh) Base per Lb.

High speed 67c.
Straight molybdenum 54c.
Tungsten-molybdenum 57½c.
High-carbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn.....	27.50	.....	.....	28.00	.....	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....	.....
Philadelphia.....	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.....	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.....	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.....	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa.....	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.....	25.00	24.50	.....	.....	.....	.....
Erie, Pa.....	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.....	24.00	23.50	24.50	24.00	.....	.....
Sharpville, Pa.*.....	24.00	23.50	24.50	24.00	.....	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati.....	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio.....	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	.....	.....
St. Louis.....	24.50	24.02	.....	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....	.....
Cleveland.....	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....	.....
Toledo.....	24.00	23.50	24.50	24.00	.....	.....
Youngstown*.....	24.00	23.50	24.50	24.00	.....	.....
Detroit.....	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.....	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. fc.†.....	.....	.....	.....	.....	.....	33.00
St. Paul.....	26.63	.....	27.13	26.63	.....	.....
Duluth.....	24.50	.....	25.00	24.50	.....	.....
Birmingham.....	20.38	19.00	25.00	.....	.....	.....
Los Angeles.....	27.50	.....	.....	.....	.....	.....
San Francisco.....	27.50	.....	.....	.....	.....	.....
Seattle.....	27.50	.....	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....	.....
Montreal.....	27.50	27.50	.....	28.00	.....	.....
Toronto.....	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace..... \$23.50

*Pittsburgh Coke & Iron Co. (Sharpville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled.....	\$3.35	\$3.25	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.50	\$3.38	\$4.65
Sheets, cold rolled.....	.....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	.....	4.24	4.90	4.23	6.85
Sheets, galvanized.....	4.65	4.85	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled.....	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled.....	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes.....	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.....	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	.....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100.....	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.....	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	.....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100.....	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43.

PRICES

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:	
6½ in., shorter and smaller	65½
6 x ¾ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed: (hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	
½ in. and smaller	62	
½ in. through 1 in.	60	
9/16 to 1 in.	59	
1½ in. through 1½ in.	57	58
1½ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 55c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 6
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Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
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Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld, Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



**"They're Easy On
The Metal"**

PEERLESS SAWS CUT FAST AND STRAIGHT . . .

Performance Report "B"

The Peerless High Duty, Hydraulic Saws with automatic bar feed are cutting 2 1/4" bars of 4140 molybdenum on vital defense work.* They are averaging four square inches a minute in this extremely tough material.

*Name on request.

As Little as 1/16" Removed by the Cool-Cutting Blade

Yes, whether it's tractors for the farmer or tanks for defense, the conservation of metals is always mighty important.

When metals are SAWED with a straight-cutting Peerless, maximum savings result — as little as 1/16" of material is removed, and there is no danger of surface hardening or fracturing the metal. Even the fine "steel-dust" is easily salvaged from the chip tray where it is neatly stacked by the constant flow of the coolant.

Less metal removed means — LESS CUTTING TIME . . . LESS HAUL-BACK TONNAGE for the railroads and LESS RE-ROLL TIME for the steel mill.

Ask all about PEERLESS — the Saw with the patented Four-Sided Saw-Frame and Backing-Plate Blade Support. A brief note on the coupon will bring a complete recommendation on any of your metal cutting problems.

PEERLESS MACHINE COMPANY, Racine, Wisconsin

Peerless
METAL SAWING MACHINES

PEERLESS MACHINE COMPANY, Dept. 1A-242 Racine, Wisconsin

Mail cutting time estimate for _____

- ☐ Mail catalog on Hydraulic type Saw for High Production Cutting
☐ Mail catalog covering Vertical type used for Die Block Work
☐ Mail catalog on Mechanical type Saw for production cutting
☐ Mail catalog on general utility and maintenance Saws

Company _____

Individual _____

Street _____

City _____ State _____

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....\$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 \$t)

F.O.B. Jackson, Ohio.....\$29.50*
Buffalo\$30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon19.50c.
1 carbon20.50c.
0.10 carbon22.50c.
0.06 carbon23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon\$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... \$2.00

Ferrotungsten, 100 lb. and less \$2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†

Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....\$142.50

Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton..... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton..... \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... \$4.75

Old range, non-bessemer, 51.50 4.60

Mesaba, bessemer, 51.50..... 4.60

Mesaba, non-bessemer, 51.50... 4.45

High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.I.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.

Indian, 48-50 Mn.68c. to 70c.

Brazilian, 46-48 Mn.....67c. to 68c.

Cuban, 51 Mn81c

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered....\$24 to \$26

Tungsten, domestic scheelite, at mine\$24.00 to \$25.00

Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton;

South African (low grade)..\$28.00

Rhodesian, 45Nom.

Rhodesian, 48Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt \$6.00

Foundry

†Connellsville, prompt .\$.675 to \$.700

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago\$12.25

By-product, New England....\$13.75

By-product, Newark..\$12.40 to \$12.95

By-product, Philadelphia\$12.38

By-product, Cleveland\$12.30

By-product, Cincinnati\$11.75

By-product, Birmingham\$8.50†

By-product, St. Louis.....\$12.02

By-product, Buffalo\$12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....\$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....\$40.00

Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes 3.00c.

Screw spikes 5.15c.

Tie plates, steel..... 2.15c.

Tie plates, Pacific Coast..... 2.30c.

Track bolts, heat treated, to railroads 5.00c.

Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....\$25.00

Domestic, f.o.b. Ohio River landing barges 25.00

No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00

Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal

Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....\$34.00

As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis...\$64.60

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30

First quality, New Jersey..... 56.00

Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55

Second quality, New Jersey.... 51.00

No. 1, Ohio..... 43.00

Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania\$51.30

Chicago District 58.90

Birmingham 51.30

Silica cement, net ton (Eastern) 9.00

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...\$54.00

Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester\$76.00

Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.....\$44.00

Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00